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free flight • vol libre

POTPOURRI

In the last issue I welcomed Johanne Piette as our new Secretary, replacing Joan McCagg. Johanne was only with us for a short time before she went on to greener pastures, and Joan stayed on part time to keep the office functioning at this very busy time of the year.

YES! It is that time of the year again. Very shortly, Randy Saueracker, SAC statistician, will be contacting clubs for their fleet and flight information, including private members' activities. And again, Zone Directors will be getting lists of tardy clubs. Last year we had very good response from the clubs, for which we thank you, and hope we have the same results this year.

Harold Eley will also be expecting claims from all pilots who have made worthy flights and wish to be considered for awards of any of the SAC trophies. So pilots, get busy.

By now, everyone should have received their 1993 membership cards and Pioneer Trust Fund donation card and letter. Donations are tax deductible. The membership cards are NOT a receipt for 1993 dues, which haven't been paid yet. They are sent out early to save postage and to assist those members who attend out–of–country contests early in the year. If you don't join SAC in 1993 we request that it be destroyed.

A VERY SINCERE THANK YOU to all those who contributed time, effort or material to their club, provincial organization, or SAC. Volunteers keep our organizations viable! Please do not be one of those who accept the goodies but are noticeably absent when it is time to put in some effort. Please re–read the guest editorial in our last issue, page 4 — it has some very valid points.

Best wishes for a merry festive season and happy soaring in 1993.

Al Sunley

Winter on the ridge

free flight • vol libre

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The journal of the Soaring Association of Canada
Le journal de l'Association Canadienne de Vol à Voile

ISSN 0827 – 2557

DEPARTMENTS

Cover

A Monerai, C–GOLL, launches for a flight at York Soaring. Photo by Jack Humphreys.

EDITORIAL

TROPHIES are on the minds of most clubs about this time of year as they are collected from last year's winner, polished up (and have broken bits glued back on), get engraved for the new recipient, and are presented at the year–end gatherings.

Here at home I've been crafting a new trophy for my club to replace an unattractive one assembled from extruded bits of metal — you know the kind. It even had a cast Tudor jet mounted on top, which I thought didn't exactly express the spirit of cross–country soaring flight for which the trophy was awarded! When I left Ottawa for southern Alberta back in 1980, the Rideau Valley club presented me with a beautiful metal sculpture of a glider as a going away present which had decorating my living room since then. It was the inspiration and became the centrepiece of a solid walnut expression of the year's best flight at Cu Nim. The sculpture can now be shared by others, and I'm sure the old group at Kars would approve.

Ursula has been particularly busy this year in collecting the details of all the flights for which SAC trophies have been awarded, right back to their inception. We always see names and years on the base of a trophy, but memory of the "why" quickly fades. Time was getting on when this information would no longer be retrievable from the old-timers, but she has been quite successful in gathering data from the fading memories and yellow logbooks of pilots, and now has about 90% of the trophy history complete in a well–stuffed binder. Ursula passes on her thanks to the many contributors who have answered her letters and to others who have provided addresses and other vital information.

Although the speeds and distances of great flights may grow with time, the effort taken in the achievement was never less. Much of this flight information will likely appear in the special 50th anniversary edition of *free flight*.

It's important that clubs reward the flight successes and the labour of their members. In big clubs this is common — a SOSA or a Vancouver Soaring have enough trophies, plaques, certificates, and funny give–aways to break a table at the annual Christmas party. It's even more important in the smaller clubs that recognition of the good flights and a reward for club work by their members be made. Such an effort pays solid dividends in club health and growth because your keenest pilots are less likely to leave. People will never begrudge doing an enormous amount of work for their group when they know the effort is useful, and especially, appreciated.

A trophy is a visible reminder of that appreciation, even if it is only assembled from bits of metal.

Tony Burton

PS I wouldn't mind getting some more flying stories to flesh out 1/93.

The SOARING ASSOCIATION OF CANADA

is a non-profit organization of enthusiasts who seek to foster and promote all phases of gliding and soaring on a national and international basis. The association is a member of the Aero Club of Canada (ACC), the Canadian national aero club representing Canada in the Fédération Aéronautique Internationale (FAI), the world sport aviation governing body composed of national aero clubs. The ACC delegates to SAC the supervision of FAI– related soaring activities such as competition sanctions, issuing FAI badges, record attempts, and the selection of a Canadian team for the biennial World soaring championships.

free flight is the official journal of SAC.

Material published in ***free flight*** is contributed by individuals or clubs for the enjoyment of Canadian soaring enthusiasts. The accuracy of the material is the responsibility of the contributor. No payment is offered for submitted material. All individuals and clubs are invited to contribute articles, reports, club activities, and photos of soaring interest. A 3.5" disk copy of text in any common word processing format is welcome (Macintosh preferred, DOS ok). All material is subject to editing to the space requirements and the quality standards of the magazine.

Prints in B&W or colour are acceptable. No slides please. Negatives can be used if accompanied by a print.

free flight also serves as a forum for opinion on soaring matters and will publish letters to the editor as space permits. Publication of ideas and opinion in ***free flight*** does not imply endorsement by SAC. Correspondents who wish formal action on their concerns should contact their SAC Zone Director whose name and address is given in the magazine.

The contents of ***free flight*** may be reprinted; however, SAC requests that both the magazine and the author be given acknowledgement.

For change of address and subscriptions to non–SAC members ($20 per year, US$22 in USA, and US$28 overseas), please contact the National Office, address below.

Deadline for contributions:

5 January, March
May, July
September, November

L'ASSOCIATION CANADIENNE DE VOL À VOILE

est une organisation à but non lucratif formée de personnes enthousiastes cherchant à développer et à promouvoir le vol à voile sous toutes ses formes sur une base nationale et internationale. L'association est membre de l'Aéro Club du Canada (ACC) représentant le Canada au sein de la Fédération Aéronautique Internationale (FAI), administration formée des aéro clubs nationaux responsables des sports aériens à l'échelle mondiale. Selon les normes de la FAI, l'ACC a délégué à l'Association Canadienne de Vol à Voile la supervision des activités de vol à voile telles que tentatives de records, sanctions des compétitions, délivrance des brevets de la FAI etc. ainsi que la sélection d'une équipe nationale pour les championnats mondiaux biennaux de vol à voile.

vol libre est le journal officiel de l'ACVV.

Les articles publiés dans ***vol libre*** sont des contributions dues à la gracieuseté d'individus ou de groupes enthousiastes du vol à voile. Le contenu des articles soumis est la responsabilité exclusive de leurs auteurs. Aucune compensation financière n'est offerte pour la fourniture d'un article. Chacun est invité à participer à la réalisation de la revue, soit par reportages, échanges d'opinions, activités dans le club, etc. Le texte peut être soumis sur disquette de format 3.5" sous n'importe quel format de traitement de texte bien que l'éditeur préfère le format Macintosh (DOS est acceptable). Les articles seront publiés selon l'espace disponible. Les textes et les photos seront soumis à la rédaction et, dépendant de leur intérêt, seront insérés dans la revue.

Les épreuves de photos en noir et blanc ou couleur sont acceptables. Les négatifs sont utilisables si accompagnés d'épreuves. Nous ne pouvons malheureusement pas utiliser de diapositives.

L'exactitude des articles publiés est la responsabilité des auteurs et ne saurait en aucun cas engager celle de la revue ***vol libre***, ni celle de l'ACVV ni refléter leurs idées. Toute personne désirant faire des représentations sur un sujet précis auprès de l'ACVV devra s'adresser au directeur régional de l'ACVV dont le nom apparait dans la revue.

Les articles de ***vol libre*** peuvent être reproduits librement, mais la mention du nom de la revue et de l'auteur serait grandement appréciée.

Pour changements d'adresse et abonnements aux non membres de l'ACVV ($20 par an, EU$22 dans les Etats Unis, et EU$28 outre–mer) veuillez contacter le bureau national à l'adresse qui apparait au bas de la page à gauche.

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Any service of Canada Post to above address. Commercial courier service, c/o "Claresholm Local Press".

COMMERCIAL ADVERTISING
National Office (613) 739-1063

Date limite:

5 janvier, mars
mai, juillet
septembre, novembre

letters & opinions

TRIP INSURANCE

After the editorial in 4/92, there were a lot of people, including myself, who closely looked at the question of sufficient insurance coverage when flying in foreign countries. I think *free flight* woke up a lot of people with this one! Well done.

Tillmann Steckner, London

SVEIN HUBINETTE'S LETTER

To the editor: I think you missed the point of Mr. Hubinette's letter when he makes reference to the "Pioneer Trust Fund". While your suggestion to him in your editorial (to contact his Zone Director) is an excellent one, and I did phone him to explain the purpose of that fund, I see his point is asking *free flight* using some space every so often to explain the object of SAC funds. With the turnover of members, I feel it is not a waste. It may save you from having to fill up with more from "Australian Gliding".

It was a great disappointment to go over the 3/92 issue of *free flight* and read the gratuitous accusations aimed at our treasurer Jim McCollum.

As Dixon More alluded to in his apology to Jim published in the next issue, it may be more difficult in the future to enlist the talents of SAC members to perform essential functions on a voluntary basis if the reward is to have your integrity questioned before an audience of 1400+ readers.

While constructive criticism is a must in order to insure that our national organization serves our needs, it would be more profitable to read suggestions on "how to" rather than "allegations". Let's hope that we can keep mud fighting out of *free flight* in the future.

Pierre Pepin, MSC

Your point is taken — a complete description of the Pioneer Trust fund and the World Contest fund is given on pages 15 and 16. Thanks also to the Board and committee chairmen for sending me more information on their current activities. Tony

SAC COMES THROUGH

There has been considerable discussion lately on the SAC budget. Where does it go, and are we getting value for our money. While I am not going to get into that debate, I would like to bring to your attention one instance where SAC, or at least the Flight Training & Safety committee, has earned its budget in spades.

About three years ago Transport Canada changed the rules regarding the written Glider Pilot exam, to require that current licensed power pilots converting to gliders write the complete Glider Pilot exam. Previously this was not required. At a time when we are trying hard to increase the membership of glider clubs everywhere, and when Transport Canada claims to be trying to make its policies and regulations more responsive to the needs of the flying community, this was a big step backwards. This may not sound like a big deal to a non–power pilot, but to someone who has already written multiple exams (and in the case of commercial pilots, continue to do so on a regular basis), taken many flight tests and medicals, and regularly has to do battle with the Transport Canada bureaucracy just to keep their licence current, the thought of more exams could be the difference between taking up the sport or heading for the golf course, particularly when the chances are these same pilots will end up working for the club as towpilots.

As you know, once the bureaucrats entrench something in the rule books it usually takes divine intervention to change their mind. This was no exception. After a slow start while it gathered some feedback from glider pilots around the country, the Flight Training & Safety committee, led by Ian Oldaker, went to work to try to reverse this new policy. It took almost two years and a tremendous amount of work by several people, but mainly Ian, to convince Transport Canada that we were responsible enough to know when a fully licensed power pilot could safely fly a glider. Finally, earlier this year, after much squirming, bobbing and weaving, Transport Canada reversed their position and cancelled the written exam requirement.

This is only one battle won, but the precedent has been set. SAC CAN make a difference and CAN make Transport Canada take notice of our needs and skills. There are other battles coming. The licence requirements for motorgliders comes to mind.

To SAC in general and to Ian Oldaker in particular, a well deserved thank you from all of us power pilots out here.

David Baker
Vancouver Soaring Association

¡ ERROR !

All SAC members are being mailed 1993 membership cards and Pioneer Trust Fund information with a return envelope for donations. The printed postal code on SAC's address is incorrect.

If you use this envelope, please correct the code to K1H 8K7 as it will speed delivery.

Joan McCagg
Secretary

A LOOK AT WAVE CLOUDS

Tom Bradbury
from SAILPLANE & GLIDING

THERE IS A GREAT VARIETY of wave forms and much one can learn from watching the associated clouds. Once upon a time people used to think that the only sure sign of waves was the appearance of lenticular bars across the sky. Since then most kinds of cloud have been found in wave systems and some of the strongest waves fail to produce lenticulars.

Basic conditions for lee waves
When horizontally moving air is disturbed by passing over a ridge the jolt produces a wide range of wavelengths. The speed at which waves travel depends on the wavelength. Short waves travel slower than long waves. The wave energy travels upwards and outwards from the ridge. Waves which travel horizontally move both up and downwind. If the wave travels downwind it is soon swept away. Waves moving upwind are slowed down by the current against them. When the wave speed equals the speed of the opposing wind the wave becomes stationary and is called a standing wave. With a low wind speed the standing wave is short. Strong winds are associated with long wavelengths.

The wave energy travels upwards as well as horizontally. It is possible to draw rays showing where pockets of wave energy will go. These rays are strongly influenced by wind speed. If the speed is constant with height the rays will be straight but on most wave days the wind speed increases with height. This vertical windshear makes the rays curve.

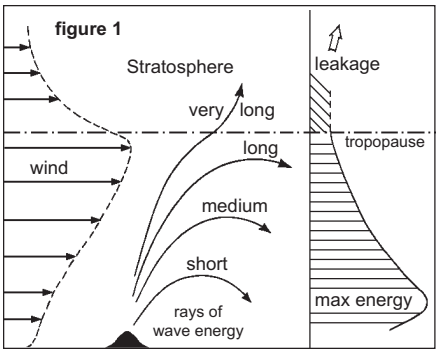
The rays representing slow moving short waves are soon bent over as the wind speed increases. Long waves, which move faster, suffer less bending by the windshear. The effect is shown in Figure 1. On the left hand side the increase of wind with height is shown by the length of the arrows. The speed often reaches a maximum just below the tropopause. In the stratosphere speeds are nearly always much less. Beside the wind profile are a series of rays ranging from short to very long waves. Short waves are bent over low down. The rays of longer waves extend higher before the wind becomes strong enough to turn them back. Some of the very long wave rays reach the stratosphere; there they meet a more stable atmosphere with lighter winds and the rays start to curve upwards again.

This description is over–simplified. To be accurate one has to include the stability of the air in the equations, but in most cases the major factor is the wind speed.

Trapping wave energy If all the rays were turned back below the tropopause the wave energy would be confined within a sort of duct like a wave guide. Such waves are said to be trapped. When reflected energy returns in the right phase the system starts to resonate; the resonant wavelength will be amplified but other wavelengths will be suppressed. Trapped waves produce a wave train which may extend downstream for hundreds of miles. When the air is moist enough to form clouds the crest of each wave shows up as a series of bars on satellite pictures.

The right hand side of Figure 1 shows how the wave energy may be distributed. The maximum is usually found at low levels. The curve shows how the energy falls off with height, but also indicates that some can leak away into the stratosphere. This often happens when the winds aloft are not strong enough to reflect the longest waves. This is termed the "leaky" mode. The bigger the leak the more rapidly the wave train decays downstream.

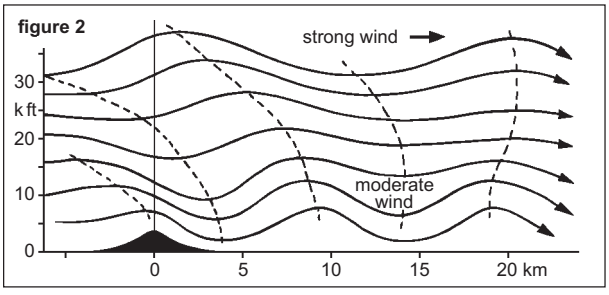
figure 1



The shape of simple waves Figure 2 shows a series of streamlines of a trapped wave. At lower levels where the wind is only of moderate strength the wavelength is drawn as about 10 kilometres and the maximum amplitude (where the streamlines have their largest undulation) occurs in the lower layers. The higher you climb in such waves the less the amplitude is. Sometimes (as in this example) there is another much longer wavelength at high levels. Then the amplitude increases again and it may be possible to climb much higher. Notice the series of dashed phase lines indicating how the wave crests above the mountains tilt into the wind with height. This into wind tilt is common in mountain areas, but where the wave train extends far downwind over flat country the phase lines are normally vertical.

Waves with no energy reflection (untrapped)
A wave can be formed even if none of the wave energy is reflected but in this case there is no wave train, just a single wave as illustrated in Figure 3. Just above the mountain the streamlines look much like a trapped wave with phase lines (shown dashed) sloping into wind. Downstream the undulations are very rapidly damped out. There are many days when strong waves occur over the mountains but little or none of the energy is trapped. These can give good climbs but conditions are very difficult for any cross–country flying. There is no recognizable pattern to the lift once one leaves the local area. Notice how regions of lift can occur vertically above regions of sink due to the tilt of the phase lines.

figure 2



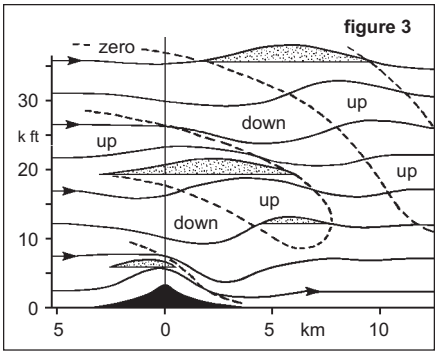
Conditions favouring good wave soaring
The left hand side of Figure 4 shows the kind of conditions which produced the majority of good wave days over the UK. The solid line gives a temperature profile (values underneath). The lowest layer is unstable with convection by day. The middle layer is very stable; there may be an inversion or an almost isothermal layer. On top is a less stable layer.

The wind profile (dashed line) shows a speed of 25 knots over the hilltops, 32 knots in the stable layer, and then a steady increase up to 69 knots at the top. The values are an average for Gold height days.

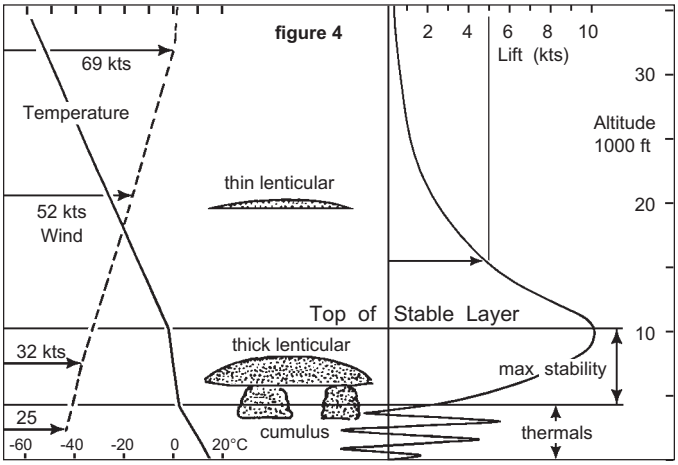
The top of the stable layer is given as about 10,000 feet. It is often rather lower. The little sketch shows cumulus clouds pushing into the stable layer where they are halted and often capped with thick lenticulars. A thin lenticular is drawn higher up but this is often in a region of weak lift.

On the right hand side is a curve showing how lift is very erratic in the thermal layer. Then in the stable layer the lift gets stronger, usually reaching a maximum close to the top of the stable layer. Above that the lift slowly decreases and (unless you encounter a long wave with its maximum higher up) the climb ceases at some high level.

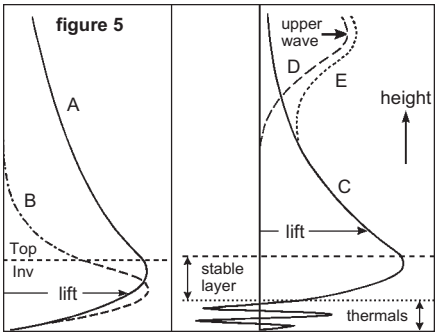
Some variations in lift Figure 5 shows two simplified situations; the left hand side has stable air extending from ground level to a dashed line marked "top inv" (for top of inversion). Above this the air is much less stable. Curve A shows that maximum lift occurs just below the top of the inversion and then dies away quite slowly as one climbs. Curve B shows a much more stable lower layer where the lift peaks well below the top of the inversion. In case B there is also a big difference in both wind speed and stability between the upper and lower layers. This usually makes the lift fall off much more quickly. One can climb quite fast at first but



then the lift rapidly dies away and becomes very weak, often limiting climbs to below 10,000 feet. If the lower layer has a very strong inversion while the upper layer has very little stability and a strong wind too, then almost all the wave activity is confined within the stable layer. Such waves behave like waves on the surface of water and some meteorological papers refer to them as "hydrostatic waves". They are good for cross–country flights but seldom good for height. The right hand side shows the more usual shallow convective layer at the bottom capped by the stable layer. Curve C shows erratic lift in second and longer wave aloft which produces a lift pattern like the dashed line D. Where the two waves are in phase one can add D to C to get the dotted curve E. This makes really high climbs possible for people with patience and a full oxygen cylinder.



Wavelength, wind speed and lift
About 35 years ago it was noticed that the wavelength and wind speed were linked by a simple empirical formula: V=6L+10 where V is the wind speed in knots in the wave layer, and L is the wavelength in nautical miles. Thus with 40 knots one would expect a wavelength of about 5 nm or just over 9 km. Do not expect great accuracy from this method!



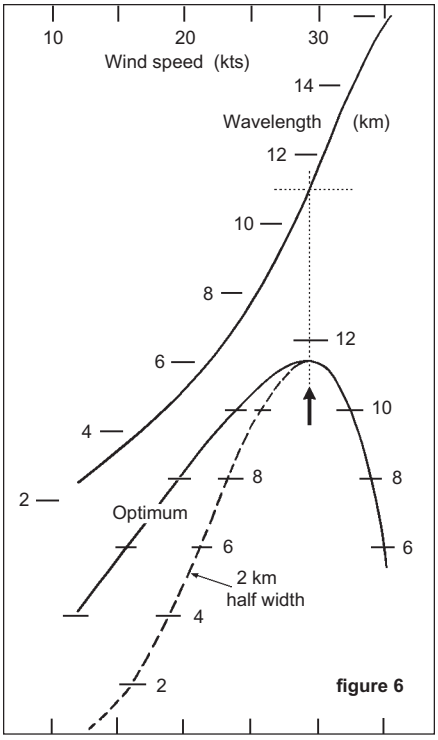
There are several relatively simple mathematical models which allow one to calculate lee wavelength and lift on the assumption that the wave energy is trapped. The easiest method is a graphical scheme first described by Casswell in the Meteorological Magazine in 1966. It has been widely used. The results are often fairly good but the system failed on many of the best wave days because it uses just two layers.

Wally Wallington wrote a lot about waves in the 1950s and produced a three layer model which differed from the older two layer models in having a convective layer at the bottom as shown in Figure 4. The addition of an unstable convective layer makes wave possible on more occasions. Wallington's three–layer model is more tedious to program but gives better results. Like all schemes which assume trapped waves it fails on days of deeper instability and/or strong low level winds. On these days wave energy is not completely trapped. The development of large cumulus adds a further problem which has only been solved by using a big computer.

A system adapted from Wallington was used to get the curves shown in Figure 6. This case assumes an isothermal layer between about 3500 and 7000 feet and a mean wind of 50 knots between about 10 to 30,000 ft. The diagram indicates what happens as the wind speed changes at the lower levels. The speed in knots is marked at the base and top. The upper curve shows the wavelength. As the lower wind speed increases from 12 to 35 knots the lee wavelength increases from just over 2 to a maximum to 16 km. The stronger the wind the longer the wavelength.

Lift is hard to predict Working out the lift is more complicated than finding the wavelength. The value depends on the height of the mountain (assumed in this case to be 0.5 kilometres or roughly 1600 feet) and the width of the mountain. Big mountains cause a larger displacement but this is ineffective if the cross–section of the ridge does not fit the lee wavelength. Long lee waves need a broad ridge, short waves work best with a narrow ridge. In practise ridges are all shapes and sizes so one cannot get any reliable results. However this need not stop us doing the sums.

The lower part of Figure 6 shows how lift would vary. There are two curves. The solid line marked "optimum" assumes the mountain width is adjustable to fit the wavelength. The dashed line marked "2 km half width" represents a fixed width. Looking at the optimum line one can see the lift increases as the wind speed rises until speeds reach about 30 knots. After that the lift falls off and the system collapses at speeds just in excess of 35 kts. This



is mainly due to the depth of the stable layer. Strong winds need a deeper stable layer for trapped waves. By raising the top of the stable layer to 10,000 feet one can accommodate winds of just over 50 knots at low levels.

The dashed curve shows how much we lose at low wind speeds by having too wide a ridge. The wavelength is too short to fit the topography. The best lift is again just over 11 knots when the wind speed is around 30 knots. Then (looking up the dotted line) one finds the lee wavelength is about 11 kilometres. However, as the wind speed falls the lift drops off rapidly and becomes less than 2 knots when the wind decreases below 16 knots.

These results are not to be trusted. They depend on the wind following the contours of the ridge and the waves having a smooth shape like a sine curve. In the practical world the ridges are seldom smooth or regular; the low level flow does not follow their shape but breaks away. The streamlines may become vertical or even overturn in some circumstances. However, it is interesting to note that many years ago the minimum low level wind for wave off small hills was put at 15 knots. More recently a summary of Diamond height climbs over the UK showed that on the majority of days the low level wind was about 30 knots.

How flow can change as wind speed alters
Figure 7 shows how the streamlines may change as the wavelength alters. In A the strong wind produces a long wavelength, so long that the flow breaks away from the lee slope leaving an eddy and often much turbulence in the valley. In B a medium wind speed shortens the wavelength and, since it fits the ridge width better, the wave has a larger amplitude and gives better lift. In C the wavelength is short. This may result in the wave steepening dramatically. In extreme cases the wave may even overturn and break, producing very rough conditions. This is described in more detail later. Finally D shows the wave-

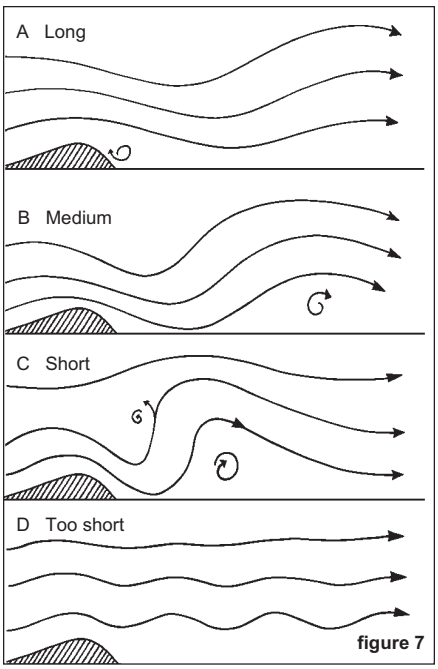


figure 7

length much too short; the wave disappears or degenerates into shallow billows too feeble to be useful.

Observations of real waves Figure 8 shows typical patterns of cloud and airflow in a moderate sized wave over the UK. The best lift was ahead of the lenticular and higher up one needed to move out over the wave slot. The upwind tilt makes wave jumping rather a test of patience. Moving forward at high speed one reaches the crest of the lenticular and expects to find lift just beyond. Often the lift does not start until one has reached or even passed the leading edge.

Lenticular clouds A long ridge usually produces a fairly even wave bar but the lift usually varies as you fly from end to end. A fairly thick lenticular is often a good indication of the best part of the wave. The much thinner lenticulars higher up look attractive but often turn out to be indicators of high level moisture rather than powerful lift. On some days these very thin and high lenticulars are part of a different wave system far above most of the soarable waves.

Starting puffs At low levels the best indications of the start of wave lift are the little scraps or puffs of cloud which appear out of nothing just in front of the main cloud bar. These fragments of cloud grow into proper cumulus as they drift downwind. They are fairly reliable markers for the start of a climb. From the ground one can watch these puffs grow into proper clouds in a minute or less but when flying the change is harder to spot.

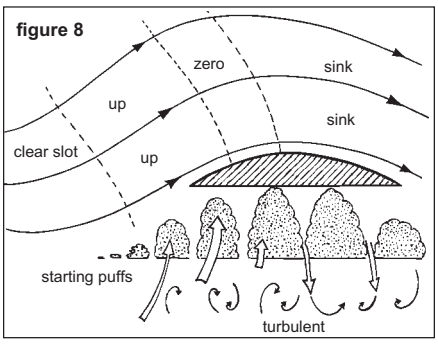


figure 8

Real waves can change rapidly Mathematical models which are simple enough to be run on an elementary school computer show that some waves are very sensitive to small changes in the wind speed or stability. An increase of only 5 knots in the low level wind, or a small reduction in the depth of the stable layer can disrupt the wave system. The simple models have to assume that the flow has settled down into a stable state. In practise it takes time, sometimes a matter of an hour or two, for a steady flow to be reached. Similarly, when conditions do change, their effect may be delayed until the system has re–adjusted itself. Large research establishments which have the use of monster number crunchers in the CRAY–N series are able to use complicated 3–D time–dependent nonlinear models which show how the changes develop and spread out. These high–tech methods are not always more useful than the answers given by simple models but they can bring out some surprising results.

Very stable waves When there is a very strong inversion and winds are fairly light, in the range 20–40 knots up to 15,000 feet agl, one usually finds a stable wave system with a short wavelength — values between 4.5 and 8 kilometres are not uncommon on such days — and the pattern is remarkably uniform over a wide area. The lift often drops off rather quickly above the cloud tops when the inversion is particularly strong. However, cross–country flying is easy while the gaps remain open. Sink is seldom strong and lift is reliable. With such a short wave length (due to a light wind as well as a strong inversion) it is easy to cross between wave bars. The only problem on such days is the filling up of gaps.

Wave slots in stratocu Figure 9 illustrates gentle wave flow with a stratocu layer tucked under the inversion. The wave slots depend on how moist the air is. Very moist air has few if any slots; their development depends on the wave amplitude. A big hill upwind often produces a local increase in the wave amplitude. Then the flow dips lower, producing a slot, and climbs higher making a dome in the cloud top.

When moister air starts creeping in one must watch for the slots filling in. Radio calls from upwind may provide some warning of this. Fingers of cloud growing across the slots are often a sign that the moister air has arrived. If caught out by closure of wave slots one may escape downwind provided there is no more high ground that way. This way one can hope to get back to the drier air which still has wave slots.

CONVECTION AND WAVES

In the late 1940s and 50s convection and lee waves were thought of as mutually exclusive phenomena. Convection was believed to halt wave activity and nobody looked for waves above a field of cumuli. Now pilots often find waves above cumulus cloud and some waves seem to require convection to initiate them.

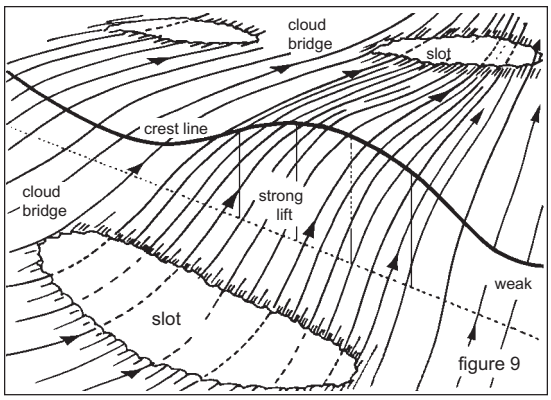


figure 9

Cloud streets and waves One of the earliest observations of waves above cu was made in Germany. A pilot flying fast under a cloudstreet pulled out to one side to avoid entering cloud. Instead of finding sink he continued to climb. The climb went on until he was high above the cloudstreets. The first Met man to learn about this unexpected phenomenon tried hard (but unsuccessfully) to find some sort of high level cloudless thermals to explain the lift. Then it was noticed that the high level winds were blowing across the streets. The streets were acting like a series of ridges producing waves in the flow aloft.

Waves parallel to cu streets Many years later these waves were studied in great detail in the USA using several aircraft. It was found that there could be a difference of up to 20 knots between the speed of the cu and the wind blowing across the streets. Wave lift was detectable up to 30,000 feet. Cloudstreets were not essential; streets of blue thermals had the same effect.

Individual cumulus clouds can also produce waves provided there is a windshear over them. A strongly growing cumulus moves at the speed of the wind low down where the thermal first became organized. As the cloud rises the stronger winds aloft blow round the side or over the top giving rise to waves. With individual cu the effect is lost when the cloud stops growing and such waves are usually short lived. A 3–D mathematical model suggested that wave energy produced when the cu tops bumped into a stable layer could be radiated up to levels near the stratosphere and then reflected back to the cumulus level. The process takes an hour or two, perhaps longer, but the result is that cumulus are damped out under the descending wave and boosted by wave lift. The feedback process can control the size and spacing of cumulus.

Waves across cu streets In the UK it seems much more common to get waves over cu streets when the upper wind does not

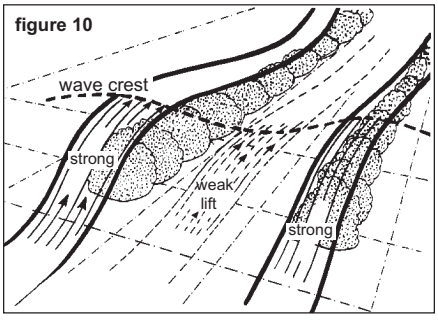


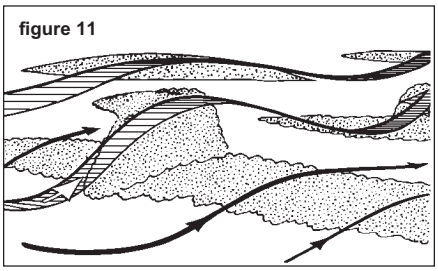
figure 10

change direction aloft. In this case the wave bars lie across the cu streets, not parallel with them as the Germans and Americans found. Figure 10 shows a 3–D sketch of the UK type of wave flow. The wave is not often marked by any lenticular; the subsided air above the cumulus is usually too dry. The upwind end of a street may mark the position of the first transverse wave. Although the wave lift goes across the gap between cloudstreets it is apt to be weaker there; the best lift lies over the cu. Getting into the wave is difficult at low levels. One needs to be right up to the cloudbase before pushing forward into the wave; entry is easier from a cloud climb.

The waves aloft broaden the cloudstreet under areas of wave lift and narrow it under wave sink. The sink may be strong enough to break the cloudstreet. Then one can get into wave at the downwind end of the break. The initial climb is usually very slow. It may be interrupted by detached clumps of cu blowing across the wave gap. If you are lower than these cu tops the wave lift tends to disappear when the cloud arrives. These cu can be avoided by moving to one side or the other until the cloud has passed. The lift is usually even weaker between the cloud lines but it can be used to maintain height until the intrusive cloud has passed.

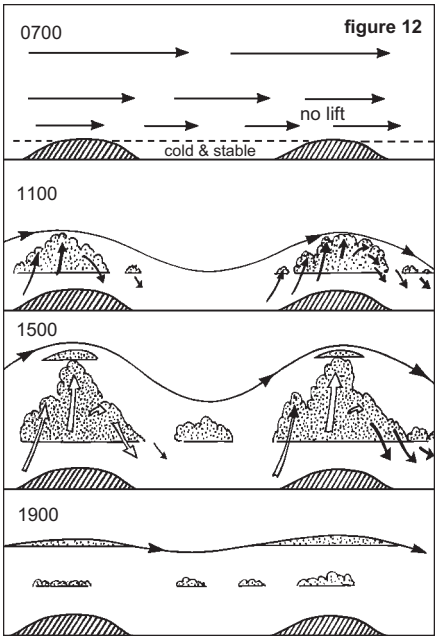
Big cu building out of wave bars
Waves are found even when the air is noticeably unstable. Figure 11 shows normal wave bars where the regions of much stronger lift have produced a large cu growing out of the bar. This stronger lift then formed a lenticular cap over the cu just above 17,000 feet. The upper air sounding showed hardly any depth to the usual stable layer in middle levels.

figure 11



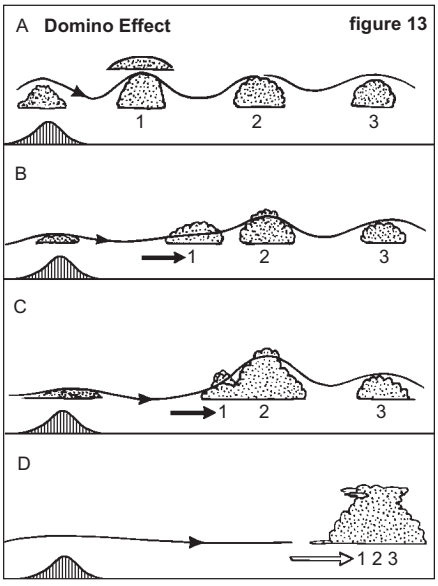
Waves which depend on cumulus
On days when conditions are just outside the range for normal waves the start of convection may initiate the wave. The sequence is illustrated in Figure 12. The numbers on the left indicate the approximate time of each stage. In the early morning when the valleys are filled with cold air the low level flow becomes blocked. The cold, dense and very stable air is reluctant to climb up over the mountain ridges. It prefers to find an easier way round by a valley. There may still be a fresh breeze over the hill tops but no slope lift. This cold air also prevents any wave flow from dipping down into the valley.

When the sun has warmed the ground for several hours cumulus appear over the mountains. They build there first partly because sunny slopes get more heating and partly because the hills are usually drier than the valleys. These early cu remain anchored to the high ground for some time. Individual cells keep growing over the ridges, are carried away by the wind and decay over the cool



damp valleys. Time lapse photography shows this cloud motion but to the casual observer the bank of cumulus seems to be a permanent feature over the ridges. As a result the ridges are effectively extended upwards by this belt of mountain cu anchored over them.

As the growing cu push up into the stronger winds aloft they start off a wave. Presently the low level block of cold air is warmed out by sunshine; this allows the wave to sweep down into the valley. Slope lift then begins and one may go from slope into waves in front of the growing cu. Pilots launched just after cu first appear can climb higher and higher as the cu builds and be well established in wave lift above the cumulus tops. Late arrivals may not be so lucky. By the time the cu has grown big the clouds are no longer confined to the hills but extend across the valleys as well. The wave lift disappears low down and the only way to reach it is by a cloud climb, which is apt to drift you downwind into the wrong part of the wave. High up above the cumulus the wave is still active. In the evening the cu die out leaving thin strands of stratocu and some high lenticulars which provide little lift.

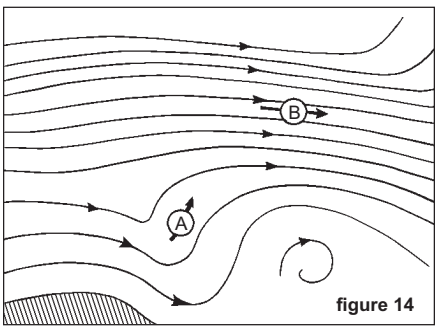


Waves after showers There is another way to get into wave lift on days with deep convection. This is after a heavy shower has passed. The departing cunim leaves a band of subsiding air behind it, together with a well wetted ground which inhibits thermals. At this stage the wave is able to reach down to lower levels where one can get in from an aerotow.

Wave collapse after end of convection
On days when waves are initiated by cumulus the end of convection can also mean the end of waves, or at least a big decrease in wave lift. Over the Highlands of Scotland the dispersal of big cu may leave an evening sky with elegant lenticular clouds, none of which gives strong lift. To lee of the lesser hills of Wales the end of convection sometimes leads to an uprooting of all the wave bars. What seems to happen is that the wave collapses but the bars of cloud take longer to decay. The original wave clouds then start to drift off station. A sort of domino effect then follows.

The domino effect This is shown in Figure 13. As the waves end the firmly anchored cloud bars lose their moorings. A deep wave bar doesn't instantly evaporate, it starts to drift downwind. The cloud would normally disperse as it drifted back into sink but when the wave motion has ended there is no marked sink so the cloud persists. It can be disconcerting if you are tracking up a previously reliable wave bar (number 2 in the sketch) and find the wave gap filling in as bar 1 approaches. Going across to the front of bar 1 is no problem because the sink has vanished. So too has the lift. If (like me) you are a little slow in the uptake you persist tracking along the now defunct wave until bars 1 and 2 drift back into bar 3. The trio produce quite an impressive cloud bank, but still no lift. Finally a view of the ground shows that you and the cloud bank are going downwind too fast for comfort.

Wave steepening Most of the early wave diagrams show regular sinusoidal streamlines with the upslope symmetrical with the downslope. This is a perfectly good pattern; it shows up very well when there are small amplitude waves under a strong inversion. On these days the wave shape is well defined by the top of the stratocu layer and it usually looks symmetrical. Some of the larger amplitude waves are not symmetrical. When the phase lines tilt upwind, as they often do in mountain regions, the upslope is steeper than the downslope. The spacing of streamlines is wider on the upslope than on the downslope. As a result one finds strong lift with very little drift on the climb but going across to the next bar brings you up against a much stronger wind. Figure 14 is one example of these asymmetric waves. The streamlines steepen just to lee of the



mountain slope at A. Higher up and further back from the ridge the streamlines slope downwards at a gentle angle but they are much closer together. Closely spaced streamlines indicate stronger winds. There is a much faster flow in the region around B. This is apt to make going to the upwind wave a painfully slow process.

Wave overturning and breaking
The upwind side of a wave usually steepens after passing over an asymmetric ridge which has its highest part near the lee side. The

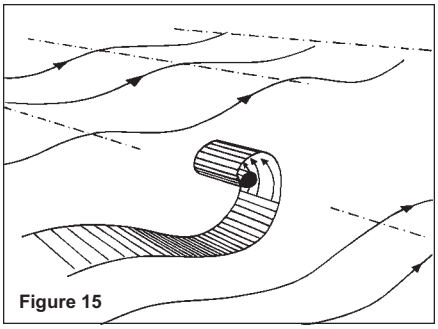


Figure 15

ridge profile has a gentle ascent to the top and then drops much more steeply to the valley beyond. Steep lee slopes often generate steep waves. The steepening is increased when the wind speed decreases upwards. Too much steepening and the wave overturns and breaks. Figure 15 shows a sketch of a series of shallow waves behind a ridge which has gentle lee slopes for much of its length but a short stretch where the ground profile is much steeper.

The Ochils have such a shape. One October day when the wavelength was just right, the wave flow first became vertical and then toppled over into wind. This process was aided by the winds which decreased between about 6000 and 8000 feet. Whenever the wind profile shows a decrease with height there is a chance that the wave will steepen and break. Underneath the curl–over may be a reversed rotor giving much turbulence.

The northwest face of the Black Mountains also has a long steep slope. Easterly winds have produced similar wave steepening close to Talgarth. The wave cloud may have an almost vertical face to it and, as at Dollar, these conditions give next to zero wind beside the cloud.

Irregular waves
Cross–country wave flights are much easier when there is a well defined wave pattern with a series of nicely separated wave bars to track along. These are most likely when the wave energy is almost completely trapped below the tropopause and nothing can get out into the stratosphere. Strong upper winds are most likely to trap the wave energy so the presence of a jet stream with its axis not too far away is a good sign.

When the winds aloft are only of moderate strength much of the wave energy may be able to escape. This does not prevent strong waves forming in mountainous areas but makes a series of wave bars unlikely. Each mountain sets off its own particular wave and the waves from one mountain may be out of phase with those from its neighbour.

Interference patterns Most mathematical wave models are confined to two dimensions: the modeller rarely has access to the big machines needed to run 3–D simulations. The 2–D models assume a ridge of near infinite length, too long for the air to slip round the end. There are not many long straight ridges in the UK; most hilly areas have a number of ridges at different angles to the wind. The wave bars are generally parallel to the upwind ridge but bars sometimes have their ends bent back where the ridge comes to an end. Two ridges at an angle may generate a zig–zag wave pattern which allows one to make progress into wind without having to make a desperate leap forward through heavy sink and against an unexpectedly powerful wind. If the ridge is shortened to an isolated peak it may set off a series of diverging waves like the wake of a ship.

Wake waves Vee–shaped wake waves can often be found on satellite pictures when there is a layer of stratocu beneath a well marked inversion just above the mountain top. Occasionally the wake from an isolated peak or group of hills may spread out downwind for hundreds of miles. Several conical peaks have been seen to originate wakes which crossed each other. This leads to interference and suppression of the waves where they cross out of phase. Some experts have used a CRAY–2 to work out the patterns produced by a single peak. I find such numerical dexterity too awesome to contemplate and await some genius to set out simple rules.

Billows on waves Billows are very short waves which occur where the vertical windshear is particularly strong over a shallow layer. Unlike the much longer lee waves billows are not linked to any ground feature. They move with the wind. The tops of anticyclonic stratocu sheets often carry a very regular pattern of billows if the wind speed increases across the inversion layer.

Billows can grow large enough to curl over and break; this is often the cause of clear air turbulence between 20,000 and 40,000 feet. When large amplitude lee waves take the air far above condensation level billows may appear over the wave crests. Large lenticular clouds look very smooth from a distance but some develop a series of tiny ripples on the top where the smooth flow is ruffled up by windshear. Occasionally the tiny ripples grow into large billows. This is probably because the wave crest consist of air which has come up from a much lower level where the wind was less strong. At the wave crest it meets the faster flow aloft and here the windshear is greatly increased.

Billows are usually aligned at right angles to the local windshear. Thus if there is a northwesterly wind which has, at some level, a marked increase in speed the billows lie northeast–southwest. Billow alignment is not always so straightforward. Some layers of altocu show two sets of billows at right angles to each other, but not in exactly the same place.

Most wave flying is extremely smooth but if you meet the ripples formed at a wave crest they produce a slight cobblestone feeling. Very big waves, those rare beasts with a huge amplitude, have been known to set off severe turbulence near the base of the stratosphere.

Conclusions — no simple pattern fits all

- When there is a strong inversion and the winds are fairly light the waves are short and have a small amplitude. Lift falls off quickly above the inversion and so high climbs are rare. Very shallow inversions need to be very strong to produce good waves. Then the sharp discontinuity of density makes the waves behave as if the inversion was a water surface; although the lift does not go high the waves are often good for cross–country flights.

- If the inversion is weakened the stable layer needs to be deeper to support lee waves. The reduced stability often helps waves develop a larger amplitude. When there is no inversion but just a moderately stable zone above the convective layer big waves can form. This gives better climbs and the lift is likely to extend higher too.

- Lift depends on the wind speed and the steepness of the streamlines. An increase of wind speed with height tends to "flatten" the wave so that the amplitude is reduced but the lift may be adequate provided one can fly fast enough. If the wind speed continues to increase with height the climb will usually end far below the tropopause.

- Where the wind speed shows a slight decrease with height the streamlines steepen. Wave steepening is helped by a steep lee slope. This often gives very strong lift but if the wave becomes too steep it may break, restricting further climbs.

- Some of the highest climbs are made under the following conditions: the low level winds are strong, producing a big deflection over the mountains (30–40 knots over the peaks); the stable layer is only just deep enough, say 3000–5000 feet; the axis of the jet stream is well away from the area so that upper winds are not too strong (less than 80 knots); and the tropopause is high so that there is little risk of waves breaking into turbulence when one gets near the base of the stratosphere. These conditions do not always favour reliable waves. Some waves reach their maximum amplitude when conditions are only just adequate, then a small increase in the winds low down or a decrease in the depth of the stable layer may cause a sudden collapse of the wave.

- Widespread waves appear when winds at mountaintop level are only moderate (about 25 knots), there is a deep stable layer (10,000 feet is good), and the jet stream is not far away from the area giving wind speeds of around 100 knots or more just below the stratosphere.

These conditions are usually insensitive to small changes in wind speed and stability. The strong upper winds trap almost all the wave energy so long wave trains can extend downwind and the wave pattern does not jump about. This makes cross–country flying easier but Diamond climbs are still possible.

- On some days when there seems to be insufficient depth of stable air, the development of cumulus over the mountains may set off waves which are only active during the day. Such waves tend to become much weaker or die out towards sunset. •

HANGING IT UP

Jack Olson
from *Towline*

THIS IS SORT of a love story.

Turtle Mountains, North Dakota 1930. You never heard of the Turtle Mountains? Look at a map, okay — "chart", of North Dakota. There, in the upper centre, sharing the Canadian border with the USA, is a blob of glacial debris, a moraine 600 feet higher than the surrounding plains known for centuries by indigenous Native Americans as "The Place of Turtles of Many Colours" (referring to the painted box turtle, its undercarapace gayly decorated for a party). It was here that I had my childhood.

My father, Jake, has been up since dawn cutting hay in a meadow near an oasis–like copse of aspen trees on the flatland prairie near the foothills of the Turtle Mountains. It was my duty, at the age of eight, to bring his dinner and thermos bottle of coffee to him. (Local terminology: lunch is mid–morning or mid–afternoon, dinner at noon, supper in the evening).

After he stopped the team and got off the mower, Papa tousled my blond hair. I wasn't sure whether his joy was in seeing me or the dinner bucket. He unhitched the horses and tied them to the wheel of the mower. He then sat down, cross–legged, on the newly mown hay and slowly ate his meal of fried chicken and home–made bread. I waited, perhaps impatiently, for him to finish.

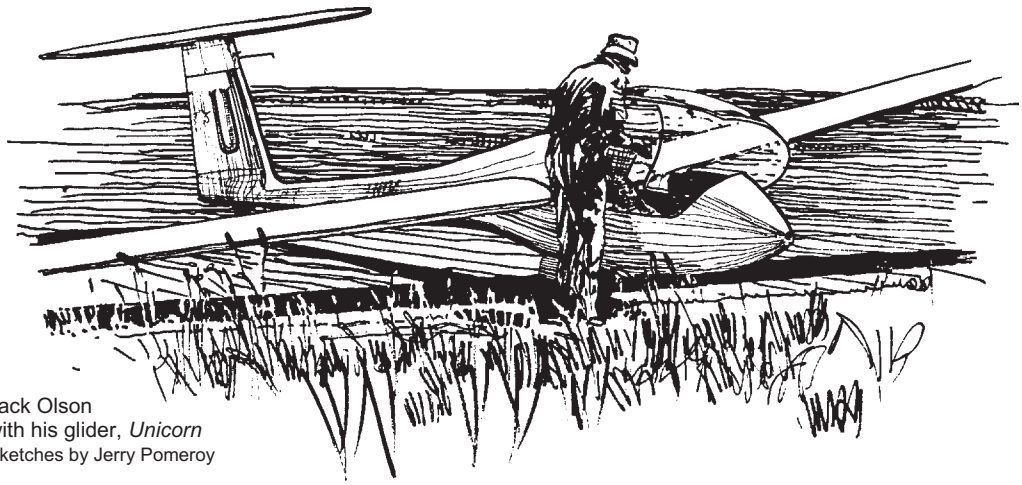
Nearby, in the small grove of aspen, two crows were very upset about a hawk perched on a dead branch near their nest. Before I went on my way home, I decided to investigate the thicket of trees. The crows calmed down when I came because I had frightened the skittish hawk away. For the ever aware and intelligent crow, an unarmed boy is no problem.

As I walked into the grove I found a sunny glade of grass. There was also the usual profusion of wildflowers and, hugging the earth of duff and loam — wild strawberries!

In the glade I first gathered strawberries. Then I found a spot in the thick grass to lay on my back, and a small rotting log to prop my head upon. Thus, while munching the sweet berries, I could watch the forming clouds above. The sound of nectar–gathering insects and Papa's mower in the meadow was the only sound except for the gentle rustle of aspen leaves.

Suddenly, there was a new sound. A sound somewhat similar to a lost kitten mewing for its mother. The strange, eerie, crying sound was familiar to me, that of a broadwing hawk. Broadwing hawks are unique in the sound they make while thermalling. It is difficult to explain, it can perhaps be described as a long drawn–out whistle dropping in tone, a tone that should be coming from a kitten not a big bird. For no other logical reason, it must be the joy–sound of soaring.

The crows darted from their nest to post guard. Then I saw the nemesis of crows, two hawks circling low in a small thermal which was drifting across the grove. The hawks were not interested in the crow's nest at the moment. As they spiralled upward, ever upward, even beyond my then remarkable acuity of youthful vision, I knew what I wanted to do someday — fly, soar like the hawks! I wanted to fly effortlessly, and play carefree in the clouds.



Jack Olson
with his glider, *Unicorn*
Sketches by Jerry Pomeroy

Thirteen years later the Army Air Corps taught me how to fly noisy, vibrating, fuel–stinking aircraft. I had found my niche and took to flying like a dog to a bone. When the war was over, I had a decision to make — stay in the Air Corps, accept a job offer by Western Airlines, or finish college. As much as I enjoyed flying, in the end I considered completion of college more important than a gamble with an uncertain career in aviation. Perhaps it was a poor decision. Nine-

continued on page 19

WAVE CAMP

Mike Glatiotis

Elaine Friesen is ready in Edmonton's venerable 1–23.

Tony Burton
Cu Nim Gliding Club

IT WAS A GOOD CAMP with many pilots of the 48 registering getting wave climbs on the Thursday, Friday, and Saturday end of the week long camp ending on Thanksgiving. That was a relief because it started out looking like another one of those, "You should have been here last week", soaring scenarios. Then it was finally Indian Summer in southern Alberta with gorgeous lennies overhead and one day provided a classic Chinook Arch. A keen contingent of Cold Lake pilots arrived for the whole camp and did most of the towing.

The opening Saturday saw a few flights and there was a little wave. Bob Mercer, a 747 driver and RS–15 pilot from the Gatineau Gliding Club was on hand, our most distant camper. His RS–15 will be staying in Cold Lake with his son Dave, and Bob plans to commute to Alberta occasionally to fly it.

Sunday morning was pretty much clagged over and didn't look as if it had any promise, but there were some training flights and enough lift by mid–afternoon for Mike Glatiotis of Cu Nim to eke out a 1:17 hour flight in "Fruit Juice", the club's Jantar. Monday was the same only worse, but there were a half dozen flights made just for something to do.

Tuesday morning was cold and it had snowed overnight everywhere but on the field (the snowline on the hills had lowered to about eye level). The day had only 2500 foot bases but it was unstable enough to provide small cu with tiny thermals enticing enough to sucker everyone aloft but not good enough to sustain anyone for long. (At least you could see the tops of the Livingstones today.) Bob Mercer was the day's scratchmaster with a 75 minute flight. Most of the entertainment that afternoon was watching the mighty George Szukala, Cold Lake's CFI, try to shoehorn himself into Fruit Juice. He just managed with no seat, no chute, and just enough foam to keep the oxygen regulator from excavating into his right shoulder blade. (He would have done a bit better if he had taken off his army boots.)

Wednesday. Flights got going after lunch when a stiff wind right out of the west allowed some careful but consistent ridge soaring to 2000 agl back on the Porcupine Hills just behind the airfield. Bingo Larue of Cold Lake in his Dart was so far back for a while he was disappearing behind the bumps, and we radioed up what kind of pizza we expected when we had to retrieve him. He got back though, after a flight of almost two hours.

Thursday. A cold front had gone through and the forecast was decidedly better — the winds were 270° all the way up although below 40 knots. The high temperature for the day was even going to allow us to peel off a layer of clothes. The major admonition at the morning pilot's meeting was, DO NOT outland the Blanik because we have no trailer — the Blanik landed out — Deirdre Duffy and Elaine Friesen of the Edmonton club doing the honours a few miles west of the airfield. Their barograph trace looked something like a pyramid, a 5000 foot tow followed by a dive to the ground after missing the wave and getting back into the rotor. In good time the ship was aerotowed off into a stiff west wind.

We got some decent wave flights finally, and Don Matheson from Vancouver Island finally got a Diamond climb in his RHJ–8 to 25,400 feet after a barograph failure last year robbed him. Climbs were slow past about 27,000 through a hazy layer of thin cirrus which topped out near 31,000. Another visitor from far away appeared on the field in the morning, Eric Durance from Windsor. George gave him a great two hour ride in the Grob 103 around the valley and up into the bottom of the wave.

On Friday the upper winds were not that favourable an angle to the Livingstones for wave, being out of the northwest, but they were howling — 56 knots at 18,000, 82 knots at 24,000, and 109 knots at 30,000! At the meeting the pilots were warned of the possibility that the high winds would come down to the surface, and DO NOT land the Blanik out. The Blanik landed out — having no trailer seems to be the kiss of death. This time it was Marek Wakulczyk of Cold Lake and Peter Clare of Cu Nim. As you might expect, the rotor gave a wild ride today, and Marek said a moment of inattention resulted in such a large loop in the towrope a release was mandatory, and down they went into a field northwest of Cowley. Don Matheson also got shot down.

There were lots of wave climbs with two getting Gold. The wave was 10 up down low, but petered out in the mid–20s. It was a happy day, and campers crawled into bed under moonlit lennies.

On Saturday morning a few more of the Calgary pilots returned to a fine sky with a vague Arch and surface winds gusting over 35 knots which shut the operation down for a while. The upper winds had moved a bit more westerly and eased off considerably (62 knots at 30,000 feet). The Arch high above, usually stationary, slowly drifted eastwards until it was 40 km downwind by 6 o'clock. Uwe Kleinhempel and a group of his students arrived from Golden with their Blanik (finally, a trailer).

Bingo was first off at 1130 and worked himself up to 30,200 (the first of several to exceed 30,000 this day). The wave was 10+ up at the bottom. Mike Glatiotis and Dave Morgan re–smoked their barographs and improved their Gold climbs of yesterday to Diamond with flights to 28,000 each, Edmond Duggan from Cold Lake got a Gold climb to 23,000 in ESC's 1–23, and Deirdre improved on her feminine altitude record of last year by climbing to 30,900 feet in the 1–23.

I shouldn't have mentioned to Jay Poscente of Calgary that the current "height–du–jour" was my 30,300 feet from Thursday — that gave him the incentive to scrabble up to 31,300 in his Mini–Nimbus to take away this year's SAC wave trophy in all likelihood. Chester Zwarych contacted the Arch when it was behind the Porcupines, the only one to do so. The front face of the Arch is not usually visible from the ground as it normally sits further west giving one only the lower leading edge to see. Now, layers upon layers of solid stacked cloud laminations could be seen — a remarkable sight from the ground and probably even more remarkable from a Chester–eye view.

Sunday morning started out clear even though it looked sort of clagged in to the north — Calgary was reporting lumpy rain. The upper winds were favourable and the bad weather wasn't supposed to arrive until late afternoon, but during the morning meeting a solid cloud deck condensed out of midair and the Livingstone peaks disappeared. As it seemed permanent, decisions were made to derig and the camp began to dismantle early. By early afternoon, only a half dozen souls remained for a local Thanksgiving dinner which was definitely worth the wait. •

I'M NOT PULLING YOUR LEG

William Thomas
from the *Hamilton Spectator*

... we find Andy Gough of Oakville in a room at the Hamilton General Hospital. A glider pilot, Andy had his perfect landing in a field near Port Matilda, Pennsylvania interfered with by hydro wires. Not a bone in either leg went unbroken. Andy's legs look like they were rebuilt by Mr. Goodwrench — two external fixators, two 18 inch nails, pins, nuts and bolts.

As Andy explained, orthopedics is no longer the media art in which the doctor sets a plaster cast and friends write obscenities on it in hard–to–erase places. Today it's the science of nails and screws, clamps and pulleys, vice grips and trailer hitches set in place by a hovering Sikorsky helicopter. Hamilton's Dr. Lachowski, reputed to be one of the best in the business, wasn't totally at ease with the re–construction job the American doctors had done, so Andy was brought down to pre–op and prepared for surgical adjustment.

Now this is where the story gets interesting and why you should never try light–hearted humour on a dedicated doctor. Dr. Lachowski walked into the operating room with his set of wrenches (I'm not making this up) to remove several strategic bolts which were not to his liking. His wrenches didn't work. The bolts holding the rods he wanted to replace, the ones inserted by the American doctors, were Italian made. They were metric bolts. Dr. Lachowski's wrenches were Imperial.

"Well," said Andy, waiting to be anaesthetized, "You're going to have to run down to Canadian Tire to get yourself a metric set. Ha, ha ha, ha. Andy was only joking. Looking at his watch and seeing it was already 8:10 pm, Dr. Lachowski replied: "I guess you're right ... and I can just make it." And with that the doctor dashed off to the nearest Canadian Tire store.

I don't know what went on in the store but I can just imagine...

"Excuse me, I'm in a bit of a hurry, could you tell me where are your Allen keys?"
"Alarm no, Allen keys?"
"Alternators are in automotive."
"Allen, Allen keys!"
"Well, you don't have to shout sir. I'm new, I'm not deaf. Try customer service."

"Excuse me ... Allen keys or Allen wrenches? I've got a patient ..."
"No such animal."
"What?"
"They're called hex keys now."
"You have them? Great. I'll take a set."
"Mastercraft or Fuller?"
"It doesn't matter, I'm in a real hurry to ..."
"Will that be cash or charge?"
"Cash, here take this and keep the change."
"Do you have Canadian Tire coupons?"
"No. Let me just leave..."
"Do you have a Canadian Tire charge card?"
"No look ...
"It'll only take a few minutes to fill out the application."
"I don't have that kind of time, I've got a patient ..."
"With the Canadian Tire card you automatically become an auto club member."
"Look, this is a matter of life and ..."
"You get a $15,000 life insurance policy if you sign up today."

It could have been worse. The doctor could have gone to K–Mart and Andy would have spent August in pre–op.

And Dr. Lachowski did his job, remarkably well, according to Andy. Bumped by an emergency that night, the good doctor and his brand new set of metric hex keys performed the procedure first thing in the morning. Andy is recovering nicely.

The moral of the story? The tools you keep in the trunk of your car — they're not just for flat tires anymore.

SAC Directors & Officers

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SAC affairs

NOTES ON THE SAC FALL DIRECTORS MEETING

The meeting was held in Toronto on 3 and 4 October. Present at the meeting were Directors George Dunbar, Chris Eaves, Paul Moffat, Alan Sunley, Harald Tilgner, Gordon Waugh and Ulli Werneburg. Joan McCagg was secretary. Director Pierre Pepin and Treasurer Jim McCollum were unable to attend. The Minutes of the 28 Feb and 1 March Directors meeting were adopted with minor corrections.

World Contest Fund An updated text of the World Contest Fund regulations was approved for insertion in the Procedures Manual. It was requested that these regulations be published in full in free flight. Fund raising for the World team was discussed. George Dunbar had investigated coins funding but found it not generally accepted. The Board will be following up on other types of fund raising of a similar nature and Joan was asked to obtain info regarding scratch & win tickets.

Review of Motion #8 of the AGM (to use 1992 Pioneer Trust Fund revenue for activities of Flight Training & Safety)
Board discussed having the funds available for the FT&S Committee CFI seminar, or the completion and printing of the long–awaited Soaring Instruction Manual. Ian Oldaker's input is required.

Trust Funds More information on the funds will be printed in free flight.

Frequencies The soaring frequency is now 123.4 MHz. Paul Moffat will write an article for free flight regarding conflicts that have occurred and availability of crystals for older radios. New hand held transceivers were discussed as to their suitability for our operations.

Finance Al Sunley read out report from Jim McCollum, Treasurer. The actual status for the first six months was fairly close to budget forecast.

Status of clubs We welcome the new Gravelbourg club which is now in operation as a SAC member. The Westman club at Brandon applied for SAC membership. It will get membership at the start of the 1993 year. Gordon Waugh reports that a Nova Scotia club is in the process of formation. Ulli Werneburg reported that the Gatineau club had a very successful 50th anniversary celebration. Our congratulations go out to them and wishes for continued success. Generally, club statistics are down from last year, although a few clubs have shown improvements.

1993 Worlds Hal Werneburg presented a report on current status. Walter Weir and Jörg Stieber have both declined participation and the other four members have not indicated their intentions. (Information from Europe and Sweden indicated sailplanes are available for rent, and accommodations are very expensive.) It is expected that costs would be approximately $15,000 per pilot. Joan was asked to contact the Sport Federation regarding possible sponsorship monies.

1993 Nationals Organization in process. Swift Current, SK is being investigated as a possible site. The facilities appear quite good and a large area available for task selection. This would be a multi–club effort similar to last year's Nationals.

1993 AGM Chris Eaves gave an update on current status of hotel space, bus transportation from Toronto airport, Aero Club attendance, and workshops. Final date still to be confirmed due to time frame of spring school break and its effect on costs of transportation.

1993 Calendars SSA calendars expected by late October, German calendars have been shipped, arrival date has not been confirmed.

Canadian Advanced Soaring Group
Ed Hollestelle, President gave a report on proposed activities regarding fund raising for the Worlds and more involvement by competition pilots in the cross–country and contest training of the ab–initio pilots. There was general support to Ed's view and it was indicated that cooperation would be required with the clubs and SAC to achieve results in their aims.

Life membership fees The question of increasing cost of the membership fee led to the agreement that in 1993 there would be a substantial increase. The fee has not changed for more than five years and does not reflect the change in the annual membership fees.

Communication Pierre Pépin and Tony Burton's notes regarding Svein Hubinette's letter were discussed and Board considered ways to improve the information flow. A start will be made by publishing the content of the various funds' regulations and the aims of such.

Tissandier award Nominations for the award were discussed and recommendations made.

Alan Sunley, president

LIFE MEMBERSHIP IS GOING UP!

The life membership donation to the Pioneer Trust Fund (now $1000) is currently under review by the Board of Directors, and it is expected to be considerably higher in 1993. So, if you are contemplating taking advantage of this taxable donation to SAC, do it soon.

123.4 MHZ UPDATE

By now, most clubs in Canada are aware of the new allocated frequency for gliders and other aerosports. One or two areas of contention in regards to this new frequency have been resolved by DoT in accordance with the Minister for Communications. You should remember, that this is not a mandatory change to your operations. If 123.3 has been clear in your area, then changing to 123.4 is not obligated. If you have changed to avoid crowding from other users and find that 123.4 is already occupied by some operator that is not on the approved users list, then you can apply to the DoT to have the offending user re–assigned.

The inspector from DoT who has been assigned to resolve these conflicts is: Cathy Fletcher, DoT, Edmonton, Fax (403) 495-5190

Paul Moffat
SAC Radio Chairman

HOW TO RUN A CONTEST

Competition is an important ingredient for any sport. It creates excitement and promotes excellence. As a bonus, it is an excellent publicity and might attract new members. Here are some tips for the next guys who want to organize competitions on a modest scale.

• try to get more than one club involved. You then draw on a larger pool of volunteers.

• get a steering committee formed six months ahead. Getting started too soon is a nuisance. With a relatively fast coming deadline, it is easier to get rapid commitments and you avoid the "call me back when you're ready" answers.

• prepare forms to record repetitious sales items (tows, banquet tickets, films). Financial information that is poorly recorded turns the treasury into a nightmare.

• scoring: we were lucky, fortunately, to have George Dunbar from Calgary come and operate his scoring program. Accurate scoring is essential to a successful competition. It validates the process and saves a lot of aggravation and arguments between contestants and organizers. What this country needs is a very friendly menu driven scoring program, available free to anyone wishing to organize competitions and capable of being used by any garden variety PC or MAC user.

• set a closing date for all bills to be given to the treasurer. Otherwise they will pop up months after.

• prepare a worksheet on your computer using your favourite number crunching software (Lotus 1, 2, 3, Excel). Enter the data as it comes, don't get behind.

• encourage early registration. We had set our fees at $200 for early registration, and at $250 for late ones. Only 60% of participants registered early. This is an additional headache for the organizers as they don't know how many to prepare for; not to mention the possibility of a deficit. My personal opinion is

(hindsight is always 20–20) — we would have been better off with a greater advantage for the "early birds" registration like $150 and keeping the late registration at $250. We always fail to encourage positive behaviour.

• get contestants to participate in the daily chores and provide their own ground crews. This will allow you to keep the number of officials down to a minimum.

• get young kids (12 to 15) to run ropes to insure a rapid launch operation. Running ropes for an hour is rough on 50 year old legs! A donation to the local boy scout/girl guide companies and a free T–shirt should get you the labour force you need.

• keep it simple. In any organization there are "need to have" and "nice to have" items. Concentrate on the "need to have".

Note to contestants: We all realize that you have put a lot into this, and that a good standing may get you on the world contest team. However, remember this:

• the volunteers who are running the show, allowing you to compete, are nice people working their butt off for free. Verbal aggression is not likely to entice them to volunteer again or encourage their friends to do so. Help them fix the inadequacies of the contest organization.

• smile (even when you outland)! We are all in this for good clean fun. A friendly relaxed atmosphere is what the doctor recommended.

Pierre Pepin, 1992 Nats Contest Manager

PROPOSED COMPETITION RULE CHANGES

Early in 1992, after the usual nine months of gestation, the SAC Sporting Committee gave birth to a new version of rules for Canadian National Soaring Championships. Now that these have been tested in the fires of the '92 Nationals (please excuse me if my metaphors are getting mixed up!) a number of changes are being proposed. Some of these changes may be considered minor corrections; others are the result of suggestions or complaints made by competing pilots.

The subject discussed most thoroughly was the POST task, now referred to as PSC, or Pilot Selected Course task. Both the US and British (BGA) systems were studied, and the following is proposed:

• Scoring will continue to be based on both distance and speed, with the division of points between these two being adjusted depending on how many pilots finish (similar to our assigned course tasks).

• In place of the present time limit, a "minimum time" will be specified. Pilots who exceed this minimum time will have their scoring distance reduced to what they would have flown in the specified time. Pilots who fly less than the minimum time will have their speed calculated based on the minimum time.

• The present rule forbidding "out and returns" will remain, with one (only) exception that the last leg, to the finish line, will be accepted even if it completes an "out and return".

• The daily maximum points will be the lesser of 1000 or 400 times the minimum time (in hours). An additional limitation is being considered for cases when all, or nearly all, pilots land out.

In order to emphasize the importance of the official rules, it is proposed that:

• the contest director will have the power to overrule a jury decision if it is against the intent of the rules.

• in the US, the body acting as "jury" MUST consist of non–competitors. This option will be made available, and will be preferred in Canada.

Finally, to agree with the new FAI rule for badge and record flights, a small grease mark must be made on each canopy before any photos are taken (other than the synchronizing photos of the official clock).

Copies of the proposed rules are being prepared now, and will be available at the 1993 SAC Annual General Meeting in London, Ontario. Copies will be available from the writer prior to this, on request.

George Dunbar
for the Sporting Committee

DESIGN CONTEST

members are invited to submit a SAC design/logo for pins, bumper stickers, free flight cover page, etc. in celebration of the 50th anniversary in 1995.

A prize of a year's SAC membership is offered

WHAT IS THE SAC WORLD CONTEST FUND?

The purpose of the World Contest Fund is to provide a source of revenue for all SAC Canadian members of any Canadian team competing at a World Soaring Championships and sanctioned by SAC.

Administration

2.1 The World Contest Fund, hereafter referred to as the Fund, shall be administered by a board of three trustees, identical with the Finance committee of SAC. They shall review the Fund as appropriate, but at least once a year and may call on an advisor as seems reasonable. The Fund shall be audited by the Association's auditors once a year. The Fund shall be reported on at the AGM.

2.2 Payout shall be made as required and by authority of the trustees. Donations made more than 90 days after the completion of the World Soaring Championships shall be applied to the next World Soaring Championships.

2.3 Payouts shall be made in the following order of priority:
- contest entry fees
- pilot travel expenses directly to and from the contest site
- rental of sailplanes and associated equipment; shipping of sailplanes and associated equipment directly to and from the contest site
- travel expenses directly to and from the contest site of Canadian crew members and Canadian team officials
- living expenses at the contest or contest practise site for Canadian team members and officials
- tow fees
- other expenses directly connected to participation in World Soaring Championships incurred by Canadian pilots, crew members and officials.

2.4 Payments from the World Contest Fund shall be made in equal portions to team members, respecting however the priorities noted in 2.3. Any team member who may have or are likely to receive significant contributions for the defraying of their expenses from other sources, such as provincial governments or associations, may wish to accept lesser amounts of payments from the World Contest Fund than team members who have not such alternate funding.

2.5 Tax receipts are to be issued not earlier than 60 days after the end of the World Soaring Championships, or 3 December of a non World Soaring Championships year.

2.6 All donations to the World Contest Fund are to be made to the Fund and not to specific team members or to specific team expenses.

2.7 SAC will issue charitable donation tax receipts to donors providing that neither they nor their immediate family benefit from the charitable donation. Receipts will be issued after all benefiting team members have been selected.

2.8 Within 90 days after the last official day of the World Soaring Championships in which a Canadian team participated, the team manager shall prepare a complete financial account and report, outlining the expenses of the team and individual team members as well as the details of the payouts from the World Contest Fund which may have been used to defray expenses of the team and individual team members for the purpose of participating in the World Soaring Championships. This report shall be made to, reviewed by and, if acceptable, approved by the Board of Directors of SAC.

2.9 Payout shall be made from the Fund no earlier than 120 days before the official start of a World Soaring Championships and no later than 90 days after the last official day of the Championships. Payouts shall be applied to expenses incurred by team members for the purposes of participating in the World Soaring Championships per item 2.3.

RADIO REVIEW — The DELCOM AIR-960 Transceiver

720 Channel COM (will tune VOR, but doesn't decode), 1.5 Watts RMS output, 12V, 80 Ma standby power, thumbwheel frequency selection audio output. DoC approved. US$289.

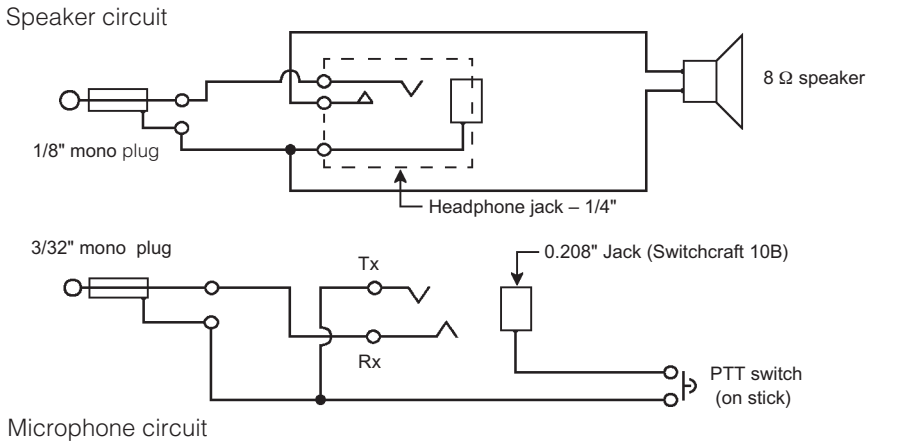
In visiting several clubs in the west this year, I am surprised that many are still flying NORDO! With so many low cost radio units currently available, it is a wonder that these clubs have not installed radios. I have made use of this radio in my Ka6CR this season, and the Bluenose club has also made use of this model. We concur that this unit is a very good value for the money and functions without any problems in all installations so far.

Although the unit is handheld, it will mount easily into a glider's panel in a minimum of space. A simple right angle bracket and two #4-40 screws is all that is needed. You will probably not want the battery pack attached in this application, as this will weigh down the back. The radio weighs only about 8 ounces without the battery. I wired mine with some solder lugs made from brass shim stock, and slipped the lugs under the screw attachments for the battery pack contacts. No alteration of the radio is carried out, you do not have to open it up.

A few plugs and jacks are all that is needed to convert the inputs to standard aviation types, and with the wiring diagram here, the radio automatically switches from handheld mike to headset operation with a PTT on the stick. (When operating with a standard microphone, the PTT on the stick will not function). Due to the proximity of the mike and speaker leads, a ferrite choke may be needed to reduce feedback (the speaker will squeal on keying the mike if this is a problem). The ferrites are available at Radio Shack. This radio has been tested with carbon, dynamic, and electret mikes, and good signal level and readability has been observed with each.

If transmitter output is too small for your situation, a linear amplifier is available ($199 US) that will boost the output from 1.5 to 10 watts.

Paul Moffat, SAC Radio Chairman



Note 1 — Jacks must be insulated from each other.
Note 2 — Microphone element in series with PTT, not in parallel as in regular radios.

WHAT IS THE SAC PIONEER TRUST FUND ?

This fund was established to provide funds on an annual basis for the general purposes of the Soaring Association of Canada.

The Pioneer Trust Fund, hereafter referred to as the Fund, shall be administered by a board of three trustees, identical with the Finance committee of SAC. They shall review the Fund as appropriate, but at least once a year, and may call on an advisor(s) as seems reasonable. The Fund shall be audited by the Association's auditors once a year. The Fund shall be reported on at the AGM.

The Fund shall be invested in assets at the choice of the trustees, (or by delegation the advisor(s). No trustee or advisor shall have a personal or fiduciary interest of a non–arms length nature in any financial instrument held by the Fund. The Fund shall be administered in a prudent manner with due regard for risk and return. In any fiscal year the Board of Trustees shall direct that up to one half of the income of the Fund that year be paid to SAC and included in general revenue.

The terms of the Fund once established shall be inviolate unless a majority of at least 2/3 of the Board of Directors and 2/3 of the votes cast at the AGM, whether by proxy or directly, are in favour of a proposed change. In the case of a bequest or gift that has restrictive covenants applied, any change proposed by SAC shall not be applicable to the bequest or gift unless the granter or his/her estate, heir or assigns as appropriate, also agree.

Expenses incurred in Fund administration, save for broker's fees, shall be borne by SAC. Broker's fees shall be borne by the Fund.

Modern Soaring Dictionary
a Handbook on Soaring Jargon

John Roake & John Phillips, $US18
Private Bag, Tauranga, New Zealand
soft cover, 226 pages, 10x21 cm

The authors have given us everything from "ab initio" to "Zuni IV" in this first edition of their compact compendium of aviation language related to soaring. Its most notable feature is the brief descriptions, complete with 3–view drawings, of over 300 gliders from around the world and over the time span of the sport. It is an interesting book to browse through.

The authors intend to update and expand on the dictionary regularly and ask readers to submit corrections, additions to data, and new words as the sport unfolds.

TECHNICAL NOTES

Automatic control connections
The Transportation Safety Board of Canada alerted us to the fact that undetected damage caused by careless rigging can result in a fatal accident. It was found that an accident that occurred over a year ago was the result of an automatic control connection (spoiler torque tube similar to a 2–33) not remaining connected because of damage hidden inside the wing. The particular details aren't important here because owners of similar types have been alerted by the TSBC but we can all learn from this. If it isn't rigging easily, you are probably doing something wrong — so don't force it! If the manual says to place the controls in a certain position when rigging to align automatic control hook–ups, then do so.

Also a positive control check is vital after rigging to ensure connections are working the way they are supposed to.

Elevator push–pull tubes in fins
It was reported that an elevator push–pull tube failed during a positive control check! The elevator push–pull tubes in fins of T–tail gliders, because they are oriented vertically, can collect moisture inside causing corrosion. This condition has been observed in Schempp–Hirth sailplanes manufactured before sometime in 1987 but is not limited to that group. The existence of a drain hole near the bottom of the tube should alleviate the problem but it may be advisable to have your AME visually check the inside of the tube for corrosion.

Noise attenuation of towplanes
Our sport is getting a bad name in some locations because of noisy towplanes. The SAC Technical committee is looking at ways of quieting down towplanes. Supplemental Type Approval from Transport Canada is required for the installation of different mufflers and multi–bladed propellers. If anyone out there has information that we can work with or pass on to other members, please call me.

Chris Eaves
Technical Committee Chairman

training and safety

INCIDENT REPORT

John H. Bisscheroux
October 28, 1992
1–26 tow release

During a tow at an excessive airspeed of 70–80 mph, this pilot experienced a release failure at 2000 feet agl. Pulling on the release (not the airbrake but the round knob in the centre of the panel) had no effect.

This was tried several times without positive result. A decision was made to position the aircraft to the right side of the towplane and to waggle the wings signifying that the towpilot must release the towrope as the glider is unable to. It was next to impossible to waggle the wings because the airspeed of 70–80 mph was too high to effectively move the ailerons to bank the aircraft left and right.

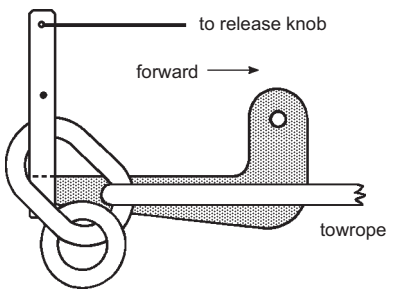
It can be stated that the excessive airspeed would have given a very low–time pilot a considerable problem in controlling the aircraft.

When the towpilot finally took notice of the situation he commenced a left hand turn whilst slowing down to a lower airspeed at which time the towrope was released of its tension and, subsequently a positive release was obtained without further incident. This occurred at 2500 feet.

Upon investigation on the ground, it could be demonstrated that the large oval Tost ring could be positioned and, under tension, lodge in such a way as to hook around the release lever thus preventing a pilot from pulling the release to disengage the release hook; see sketch below.

It was also demonstrated at the same time that perfectly round (2.5") Schweizer–type rings do not have the same characteristic as oval Tost rings and will slip from behind the release lever to take its proper position on the hook.

The Montreal Soaring Council has immediately commenced with a solution where a large round ring is added to the Tost oval ring, thus giving all–round capability for Tost and Schweizer release hooks. It is expected this will solve the problem.



oval ring lodged behind release lever

L–19 FLAP LEVER SYSTEM

In the Montreal Soaring Council towing operation using three L–19 towplanes, we have encountered various problems with the flap system over the past 10–15 years.

Failures have occurred where the flap–lever attachment bracket to the cockpit floor failed one or all its attachment points to the floor. Recently we had a failure of the flap handle cable attachment lever causing both flaps to lose down positions 1, 2, and 3.

The last failure (flap handle cable attachment lever) cost us $1000 to fix including labour, new cable (broken strands) and rewelding of flap handle including manufacturing of assembly jig. Without going into the exact failure points (this information can be obtained from the writer), I want to draw the attention of all L–19 operators to the following:

- An L–19 flap handle requires a relatively small force to set flaps in the full down position (third notch) at a maximum IAS of 60 mph, whereas the force required to apply flaps in this position at higher airspeeds becomes practically impossible. This points out the fact that forces at the flap lever attachment points become very high at airspeeds in excess of 60 mph.

- The aircraft stalls with full down position flaps at an airspeed considerably lower than 60 mph.

- The potential for a catastrophic failure of flaps (ie. total flap loss on final at too low an altitude to rotate, and apply power to arrest the sudden descent rate) is a reality to consider.

As a result, MSC has instructed its towpilots to follow the following procedures:

- do not use flaps after release and let down to downwind leg. Descent patterns can be made at 120 mph whilst throttling back to near idle in intervals coinciding with proper engine cooling rate.

- slow down to 80 mph shortly before turning base and apply first notch of flaps. Propeller braking should be used as required.

- when airspeed reaches 70 mph apply second notch flaps and,

- at 60 mph apply full flaps and adjust engine rpm to maintain airspeed of 60 mph down to a few feet above ground at which time the throttle should be completely closed and the aircraft rounded out for a three point touchdown.

We are confident that flap failures will be completely averted by using these procedures as the point loads are minimal and well within the design features of the flap system.

John H. Bisscheroux

INCIDENTS & ACCIDENTS

13 Sep	Outardes, PA18 Super Cub, C–GVGJ. Landing gear collapsed and aircraft went into ditch. $8000 claim.
26 Sep	Gatineau, Citabria, C–GQIH. Left landing gear fractured, aircraft groundlooped with extensive damage. $24,000 claim.
4 Oct	COSA, Cirrus 75, C–GGXT. Hard landing following aborted takeoff. $10,000 claim

EASTERN INSTRUCTOR COURSE

The SAC Eastern Instructor Course was held at Gatineau Gliding Club June 14–20, and run by Paul Moggach.

Congratulations to all the attendees and thank you for your commitment to close the circle on your own start in the sport. At the course was Joe Bowe, David Buttery, Ian Dudley, Martin Hickey, Norman Perfect (an excellent surname for an instructor), Alex Powell, Chris Story and Andrew Robinson.

Coming Events in 1993

13 January 1993, **Toronto Glider Pilot Ground School**, Weds evenings 7–10 pm for 10 weeks. Contact school at (416) 789-0551 for registration information, or Paul Moggach (416) 607-4109

5-7 March 1993, **SAC AGM & CFI Seminar**, London, ON. More information on page 19.

6-27 June 1993, **World Soaring Championships**, Borlange, Sweden. For info contact Hal Werneburg (403) 238-1916.

6-15 July, **National Soaring Championships**, Swift Current, SK. Practice days 4-5 July. Supported by the prairie clubs. More details later. Contest manager, Tony Burton (403) 625-4563.

5-9 July 1993, **Fun soaring contest**, Gatineau Gliding Club, Pendleton, ON. For sports, club, and 1–26 sailplanes. Contacts: Richard Officer (613) 824-1174, Glenn Lockhard (613) 692-3622.

24 July - 2 August, **Cowley Summer Camp**, Canada's largest and best soaring get–together. Sponsored by the Alberta Soaring Council, contact: Tony Burton (403) 625-4563.

7-11 October, **Cowley Wave Camp**. Contact Tony Burton (403) 625-4563.

club news

TORONTO SOARING CLUB

Toronto Soaring Club was prevailed upon to host the Ontario Provincial Soaring Contest, 1–3 August, 1992. It was somewhat of a season record that we were able to fly two days out of three that weekend. Only the Sunday was a soggy washout.

The approach of this event gave us the incentive to make some progress on our club room. There's nothing like a deadline to get things moving. Though incomplete at the time of the contest, we were able to offer our guests a comfortable venue for pilots' meetings and for social and dining purposes. The kitchen facilities were fully functional and, over the three day period, there were 80 breakfasts and 156 dinners served.

It is difficult to name the outstanding people who contributed so much to the success of this venture without omitting some very deserving people. However, for the competition organizing side, credit should go to Steve Foster who did a great job. On the catering side, thanks go to Yvonne Foster, Margaret Parker and Giesela Bunder. These three did heroic work in preparation of the menus which we were able to offer. Let me hasten to add that it was a team effort and others made important contributions also.

It has not been a great flying year because so many weekends were marred by low cloud, high wind and rain. On the plus side, however, it was found possible to organize some impromptu weekday operations, so over all it has not turned out to be a bad season. The latest acquisition to our fleet is a Puchacz which was delivered last year and which is proving to be a very popular ship. Club membership has experienced a boost over the past year or so and we are pleased to see this after so many years with few new members. Among the new members we are very pleased to have with us are Stephanie Kramer (age 16) and Karen Healy (age 15) both of whom soloed this year.

It is not many years since one of our members complained that we were a club of old men. There are plenty of the geriatric set — your scribe included — still within the club, but the infusion of younger members is very encouraging. So as the 1992 season winds down we look forward with optimism to the future. Who knows, by the time this sees print, we should have a ceiling in our club room.

Ken Ferguson
past President

WINNIPEG

Before sitting down to write this article I spent an hour or so going through some old issues of free flight to find what had been written about our club in the past. It is amazing at the amount of slow but definite progress that has been made over the years.

In the 4/91 issue I reported that a new club was likely to be formed in the Brandon area. Well, now I am pleased to announce that it is official, the Westman Soaring Club is now part of SAC. Although they got going late in September of this year they are keen and with the support of our club and the Manitoba Soaring Council will be ready to go all out in the spring of 1993. A privately owned Bergfalke II has been sold to them and our club has stationed a towplane out there. There is no doubt that many Winnipeg members will be jealous of their locale: five miles from the city at a municipal airport that sees only one scheduled flight a day and very limited flight training, excellent soaring conditions and some of the friendliest people around!

In the 4/89 issue I told you of a Ka6 that was bought by Paul Moffat and was in need of rebuilding. Well, after three years of hard and dedicated labour Paul was rewarded with his first flight in it. He even managed to find some late October thermals to really see what the performance was like. It looks great Paul.

In the 1/89 issue I recapped the flying season in detail. Funny, you could change the date to October '92 and it would read the same. We were busy this year with some away from home publicity. We attended the second annual fly–in organized by the local ultralight club and also attended a grand opening of a new airport north of Brandon. As we do every year we supported the Western Canadian Aviation Museum with a fly past at their annual fall BBQ held 20 km northeast of Winnipeg. Always lots of fun, although this year it was a cool windy day and the turnout was not that great.

1992 was not a great year for flight statistics. We managed to fly only about 70% of the days available due to weather and during those days only saw around 900 flights in total. Our treasurer has had a tough time keeping up with his budget based on more flying and has had several revisions. But we had fun. We saw several organized evening BBQs on Saturdays through the year, the most successful being a Thanksgiving dinner held 3 October. Over 45 members attended and feasted on a variety of dishes. An excellent way to wrap up the end of the year. On a final note, it used to be that an optimist at the gliding club would look out the window on a rainy day and say "It's clearing in the west". This year it seems that the same optimist would look out the same window and comment "there is always next year". SEE YOU IN '93.

Mike Maskell

Ken Ferguson

A bemused Ed Hollestelle looks on as Chuck Keith arranges his spare parts at the Ontario Provincials.

Ka6CR FLYING AGAIN

Once belonging to the Saskatoon Soaring Club, C-FSHG has been resurrected from the final "Wood Stove in the Sky" and is now back flying. I purchased the wreck from the Insurance company in 1988 for the grand sum of $500 (including all the instruments) after the left wing had been wrapped around a post and the rest into a barbed wire fence. The left wing was virtually destroyed, with only the outboard eleven feet usable. The fuselage had a hole punched in the side, caused by the wing spar splitting at the root, and the horizontal stabilizer was holed as the fuselage ran over the wing remains. Nevertheless, I was determined (with the help of Neville Robinson) to restore this now vintage glider.

The glider was completed in July 1992, and was given its new C of A. Then followed the Pilot's Curse as six weekends of rain delayed the test flights. The first flight was just a short hop to ten feet altitude, release and land, during which time I checked for stability and maintenance of control. Everything was great, and I struggled with the impulse to keep on going on tow, but that was not the plan. The next tow was to 3000 feet and various maneuvers were tried to test flight conditions: slow flight, stall, faster speeds, turns, etc. The glider was flawless (almost — I forgot to put on a yaw string!) and my partner concluded the same after he took the next flight.

Now I am concentrating on the various fittings and gadgets to stuff the glider properly into its trailer. I have already worked out procedures that allow me to rig and derig without assistance, as long as the winds are light.

Paul Moffat, Winnipeg Gliding Club

HANGING IT UP

from page 11

teen years went by before I had an opportunity to fly again. In 1964 I learned that Boeing had a soaring club. I joined immediately. Club rules were more relaxed in '64, so in little more than a month later I was an instructor. Once again happily flying every weekend, I was angry at myself for having missed nineteen years of flying joy.

All club members were encouraged to fly cross–country as soon as there was a good chance he or she might survive. My first attempt was in the club's venerable Schweizer 2–22. I didn't get very far from Fancher Field, about twenty–three miles. I landed in a fallow field half way between Douglas and Coulee City. Despite the hassle of de–rigging the 2–22, my appetite for cross–country flying was stimulated to the point of obsession.

All aspects of soaring appealed to me. There is little need for me to tell other glider pilots of the joy I found flying the ridge at Badger Mountains, or catching a "wave" over downtown Wenatchee, the thrill of a last minute "save" over a plowed field in the middle of unpopulated nowhere, the I've–saved–my–butt relief of catching the last thermal at low altitude to make it home without a retrieve.

There were times when the soaring weather was poor and made it nigh to impossible to stay up, but the camaraderie of a bunch of pilots drinking beer and lying about how good flying tomorrow would be, made up for the wasted effort of making a declaration. Speaking of declarations, I probably made more declarations than any person in soaring history before I got the distance leg of my Diamond badge.

As far as handling the aircraft, I guess I was a competent pilot, perhaps still am. The fact that I landed out well over a hundred times suggests that I was only an average soaring pilot. But — ah, those landouts ... the many farmers that I met and shared an evening meal with. One thing I learned: almost all farmers have daughters — none have daughters over twelve years old.

The landouts may have been the most satisfying of all. First would come the depressing realization I'd been beaten, checkmated in the main game, but still there remained the challenge to make a safe landing. Secondly, there was the anxiety involved in preparing to land in a strange place ... quick search for hidden aerial or surface booby traps ... then the touchdown. Finally, the relief of landing safely usually made up for the disappointment of failing to reach my goal. Sometimes the landings were without anxiety, such as on duster strips, paved airports or on a large fallow field near a farm with a swimming pool.

There were other times when the pressure was very noticeable. Times when the only option was a country road, a state highway, a bean field, a pasture, on places jammed with cattle or other unpredictable critters, a backstreet in a small town. Even if the landing site was benign, sometimes there were howling crosswinds, sudden rain or snow squalls or darkness. Yes, darkness ... once at Issaquah in a 2–22. I had caught a wave not long before sundown. Then, from my height I saw the sun was about to touch the horizon but, oh–oh, the ground was already in deep shadow! I hurried to get back before it got really dark — I didn't make it, strong lift all the way. Gosh, it had sure gotten dark quickly! The field was identified only because it was the only large area totally unlit. The string of automobile lights on I–90 marked the south end of the black patch. I made a pattern to land on an inky field. My unlit instruments couldn't be seen. Luckily, Doreen Chase was still at the field in her car doing paperwork concerning the day's flying activity. She opened the door of her car and the dome–light came on to provide a marker light to judge my altitude. The actual landing was uneventful. My lady passenger thought the flight had been delightful (?)

Many other flying memories remain: one notable example ... the time I landed, rolling almost to the front gate of a ranch in sagebrush heaven. The big "John Wayne" owner ambled over just as I was opening the canopy. He didn't look happy. The first words he ominously spoke as he towered over me: "Are you a Republican or a Democrat?" With some mighty speedy thinking, I replied, "One of the good guys." He nodded approvingly, "A Republican then." "Yup, yes sir, that's right!" Never before had I switched political allegiance so quickly.

For some, contests are fun. For me, my bag was expeditions to places untried, virgin air. Like gold fever, whenever to wherever an expedition was planned, I wanted to go and did: Oregon, Montana, Colorado, Idaho, Wyoming, Utah, California, Arizona, — wonderful.

This year, 1992, sixty–two years after watching the hawks soar above an aspen grove, I went to fly during Labour Day weekend at Ephrata. It turned out to be the best soaring weather I have encountered in a long time. It was a point–your–glider–and–go day, hardly even a need to thermal.

While flying at 80 knots under cloudbase, a Blanik whizzed by me fifty yards away. I hadn't seen it when I should have! Later, Vitek Siroky streaked by me. I hadn't seen him either! Whether they saw me or not isn't the issue. That I had not seen them — is. I gave that a lot of thought ... "Jack, oldtimer, perhaps it is time to hang it up." In addition to my lessened alertness and eyesight, there are other reasons to consider. I'm not a strapping, virile young guy anymore. Landing out in a deep–dust fallow field may be more than I can handle physically. Also, I've been getting careless lately, like forgetting to call out my airspeed in the pattern, not thoroughly checking my rigging. "Jack, you're not the only guy up here playing in the clouds, perhaps for the safety of the other pilots, it is time to hang it up and put your toy away."

Later, as the sun neared the horizon, I was on a long final glide from Mansfield. As the buckskin–coloured fallow and stubble wheat fields slid below me, I was engrossed in thought ... "My hearing is poor, no longer can I hear the cry of the broadwing hawk — in my mind I hear the fat lady singing."

Will Jack miss soaring? Come on, we all know the answer to that. Adios amigos. •

SAC AGM

March 5–6–7, Ramada Inn, Hwy 401
London, Ontario

Theme:	**"Training – It's Never Over"**	for more info call
Friday	**CFI Seminar**	Chris Eaves
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refer to Canadian conference # 0104, Aero Club of Canada

CFI Seminar Update

Plans are proceeding for the seminar to be held in conjunction with the 1993 SAC AGM. Club CFIs and/or Safety Officers are invited to attend this Friday meeting to hear presentations on subjects of interest to CFIs including early training, pilot decision making, post solo and post licence training, cross–country training, and the Bronze badge. Ontario CFIs will be eligible to receive partial reimbursement for travel and accommodation expenses from the Ontario Soaring Association. CFIs in other provinces should contact their provincial association to see what is available to them. We hope that as many CFIs as possible can attend what should be a very interesting weekend.

FAI badges

Walter Weir, 24 Holliday Drive
Whitby, ON L1P 1E6 (416) 668-9976 (H)

The following Badges and Badge legs were recorded in the Canadian Soaring Register during the period 1 September to 3 November 1992.

GOLD BADGE

263	Claude Gosselin	Champlain

SILVER BADGE

837	T Robert Harling	York
838	Leo Reypert	Erin
839	Jean Papillon	Quebec
840	William Park	Gatineau

DIAMOND ALTITUDE

	Claude Gosselin	Champlain	5020 m	SZD 41A	Sugarbush, VT

DIAMOND GOAL

	Jay Poscente	Cu Nim	302.4 km	Mini–Nimbus	Black Diamond, AB

GOLD DISTANCE

	Sue Eaves	London	310.0 km	LS–4	Embro, ON

GOLD ALTITUDE

	Claude Gosselin	Champlain	5020 m	SZD 41A	Sugarbush, VT

SILVER DISTANCE

	T Robert Harling	York	65.2 km	1–23	Arthur East, ON
	Leo Reypert	Erin	67.0 km	IS–29D2	Grand Valley, ON
	Jean Papillon	Quebec	71.6 km	Pilatus B4	St–Raymond, PQ

SILVER DURATION

	William Park	Gatineau	5:01 h	Skylark 4B	Pendleton, ON
	George Dean	Vancouver	5:23 h	Blanik L13	Hope, BC
	Michael Morgulis	Air Sailing	5:13 h	K–13	Belwood, ON
	Daniel Eley	Regina	5:38 h	1–26	Colonsay, SK

C BADGE

2353	Tarek Sardana	Cold Lake	2:00 h	1–26	CFB Cold Lake, AB
2354	Daniel Chevrefils	Montreal	2:34 h	1–26	Hawkesbury, ON
2355	Kevin Dineen	Montreal	2:00 h	Blanik L13	Hawkesbury, ON
2356	Karen Healy	Toronto	1:22 h	2–33A	Conn, ON
2357	George Dean	Vancouver	5:23 h	Blanik L13	Hope, AB
2358	Michael Morgulis	Air Sailing	5:13 h	K–13	Belwood, ON
2359	Daniel Eley	Regina	5:38 h	1–26	Colonsay, ON

WORLD CLASS GLIDER FLIGHT TESTS

An expert jury appointed by the FAI International Gliding Commission (IGC) completed an evaluation of six prototype gliders on 4 October at Oerlinghausen, Germany. This comprehensive three week evaluation ended the second phase of a competition for a glider design suitable for use by soaring pilots throughout the world, to be used for World Championships and perhaps future Olympic Games.

The prototype evaluations were conducted by a six person jury, with the assistance of four test pilots and three consultants, plus support by the German DLR and the Oerlinghausen Segelflugschule (glider flight training school). Six gliders were evaluated, representing entries from five countries. In addition to engineering and cost evaluations, the gliders were studied to determine human factors considerations, ground and flight handling qualities. The American entry was considered to be insufficiently prepared for flight evaluation. Some 106 flights were made with five gliders for a total of almost 75 hours of flight time. Both aerotowing and winch launching characteristics were explored. In addition to flights by jury members and evaluation test pilots, a few flights were made by invited racing pilots and International Gliding Commission officials.

The World Class jury, chaired by Professor Piero Morelli of Torino Technical University of Italy, is now preparing its evaluation report for the IGC. According to pre–announced rules for the competition, the IGC may consider the evaluation results and ... "either designate the winning design or declare there to be no winning design. In the latter case IGC may amend, postpone or cancel the competition." Although no deadline has been given, it is expected that the IGC will announce a decision before the end of the year.

The prototype evaluation began on 14 September 1992. The jury and supporting personnel of four groups was made up in the following way:

Group 1 Flight performance and handling qualities — Oran Nicks (USA), Mike Valentine (Australia), and Mike Curning (England)

Group 2 Airworthiness — Petr Kousal (Czechoslovakia) and Benno Schmaljohann (Germany)

Group 3 Production methods and costs — Friedrich Tanneberger (Germany) and Jean Cayla (France)

Group 4 Human factors — Antony Segal (England)

Ground measurements and operations were the responsibility of Dietmar Schmerwitz, DLR (Germany). Test pilots were: Gerhard Stich, DLR (Germany); Dick Johnson (USA); Sakari Havbrandt (Sweden) and Jan Gawecki (Poland).

The prototype teams arrived on 13 and 14 September. The first tasks of evaluation involved reviews of airworthiness documentation and determination of weights and centres of gravity for each glider with various test pilots and parachutes. Rigging and ground handling reviews began, along with assessments of cockpit suitability and crashworthiness features. Briefings were given to the jury by the entrants concerning the designs and the ground and flight testing that had been conducted before the prototypes were brought to Oerlinghausen. When a glider was declared fit to fly, the FAI IGC test pilots began familiarization flights, followed by evaluation flights involving performance measurements, handling qualities assessments, stall speed and other parameters.

The first gliders prepared to fly were the PZL 51–2 entry from the Polish factory PZL Bielsko and the L–33 "Solo" from the LET factory in Czechoslovakia. Both of these gliders are being planned for production, regardless of the competition outcome. They were first flown by FAI IGC test pilots Dick Johnson and Jan Gawecki on 18 September. On the same day, the jury decided that the American "Cygnet" entry, which had only two hours of test flying before shipment to Oerlinghausen, was not sufficiently prepared to fly. This was a very difficult decision to make, especially considering the long distance the team had come to participate in the prototype competition. However, all other aspects of the evaluation process were continued for the Cygnet.

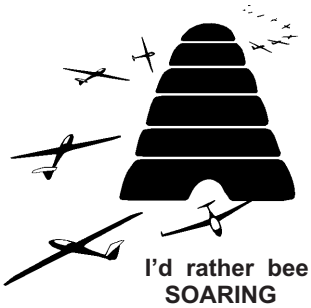
The PW–5, designed and built by the Warsaw Technical University in Poland, was also approved for its first flight and flown by Sakari Havbrandt on the 18th. The Italian entry "Velino" and the two Russian gliders continued in review, with the Velino cleared to fly on the 23rd, after detailed discussions about structural and flutter analyses and the conduct of special ground tests. It was first flown by Jan Gawecki and inspected carefully after each flight until confidence was gained in its structural integrity.

The first flight of Russia 2 was made 23 September by Sakari Havbrandt. He had difficulty with limited pitch control but made a short flight and returned safely. Detailed study revealed an elevator rigging problem and a centre of gravity problem that required ballast in the nose. After these modifications were made by the Russian team, the glider was successfully evaluated by several pilots. A smaller glider with only 11 meter wingspan was brought by the Russians and designated Russia 1, but it was not approved to fly by the FAI IGC pilots after a structural weakness was discovered in a spoiler actuator.

Flight tests were made with instrumentation provided by the DLR, calibrating the gliders and conducting performance comparisons. Glide ratios, maneuvering qualities, stall speeds and characteristics were determined. A final series of flight tests were made on the five gliders with simulated rain drops or bugs near the wing leading edges to determine sensitivities to turbulence on their laminar wings.

Once all the data were obtained and analyzed, the jury, test pilots and consultants spent three days reviewing and discussing the findings. An evaluation report based on these findings will be submitted to IGC officials for their consideration and final decision.

submitted by Colin Bantin, SAC IGC representative



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SOARING STUFF / ARTICLES DE L'AIR

December 1992

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4	GLIDING SWEAT SHIRT specify size – S, M, L, XL	25.00				*	SWEAT SHIRT de VOL à VOILE précisez la taille – P, M, G, XG
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6	GLIDING HAT baseball style	6.00				*	CASQUETTE de VOL à VOILE style casquette de baseball
7	GLIDING BEANIE white with blue gliders	10.00				*	CHAPEAU de VOL à VOILE blanc avec des planeurs bleus
8	GLIDING TIE blue with white gliders	20.00				*	CRAVATE de VOL à VOILE bleue avec des planeurs blancs
9	Decal – "I'D RATHER BEE SOARING"	.75				*	Auto collant – "I'D RATHER BEE SOARING"
10	SUNSHADES (sun protector for your car windshield; design SAC•ACVV)	10.00				*	SUNSHADES (para–soleil en carton pour votre voiture; dessin SAC•ACVV)
11	CLOUDBASE cassette of original gliding songs by Ed Kilbourne	12.00				*	CLOUDBASE cassette de chansons originales de vol à voile par Ed Kilbourne
12	1993 SSA calendar	15.00				*	1993 calendrier de SSA
13	1993 German "Bildkalender'	26.00					
14	Tost rings (4 for $110)	28.00				*	Anneau de remorquage Tost (4 pour $110)
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20	*SOARING CROSS–COUNTRY* by Helmut Reichmann	55.00					*SOARING CROSS–COUNTRY* par Helmut Reichmann
21	*FLYING SAILPLANES* by Helmut Reichmann	48.00					*FLYING SAILPLANES* par Helmut Reichmann
22	*WINGS LIKE EAGLES* by Paul Schweizer	55.00					*WINGS LIKE EAGLES* par Paul Schweizer
23	*PRACTICAL WAVE FLYING* by Mark Palmer	17.50					*PRACTICAL WAVE FLYING* par Mark Palmer
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25	*TRYING THEIR WINGS* (BC gliding 1920-80) by Lloyd M. Bungey	15.00					*TRYING THEIR WINGS* (vol à voile en Colombie Britannique 1920–80) par Lloyd M. Bungey

continued on other side — voir au verso

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6	FAI GOLD badge, cloth, 3" dia.	4.50				*	Insigne FAI OR, écusson de tissu
17	SAC FLIGHT DECLARATION FORM	0.15				*	Formulaire de déclaration de vol de l'ACCV
18	SAC guide "Badge and Records Procedures", edition 6	5.00					ACCV guide des procédures pour FAI certificats et insignes (éd. 6)
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M100S, C–FBNG, #59, 540h, never damaged, recovered with Imron paint (white/red trim) 1987. Std instruments, Ball 401 TE with audio, chute, covers, wing stands, encl metal trailer. $8700. Mike Perrault (514) 331-9591 eve.

PIONEER II, C–GLUV, in mint condition, new canopy, standard control stick mod, elec. vario. Alum trailer can be towed by small car. $9000. Paul Daudin (514) 621-2535 or Albert Sorignet (514) 331-4614.

BG–12, CF–RCU, 150h, needs canopy and work on one wingtip, trailer available. $3750. Jim Howse (403) 457-1883 (H), 493-5341(B) or John Klute 475-8336.

Ka6E, C–GTXP, 730h, good condition, kept in encl metal trailer. Full instrumentation, O2, chute. At Edmonton. $11,000 obo. Morvyn Patterson (403) 458-9527, Barb MacKintosh (403) 472-1634.

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LARK IS29D2, 1992 models, all aluminum, 37:1, fully aerobatic, +5.3/-2.65g limit. Howard Allmon (305) 472-5863, fax (305) 473-1234.

LARK IS29D2, C–GBEQ, about 1000h, excellent condition, never spent a night outside, C of A to Aug '92, Radair 360, Cambridge vario, O2, chute, metal encl trailer. Asking $22,000. Denis Gauvin (418) 842-6456.

JANTAR STD 2, C–GGEA, excellent condition, alum. trailer, chute, instruments, tail dolly, wing stand, etc, contest ready. Walter Herten (416) 689-5267.

JANTAR STD 2, C–GKED, 120h, excellent condition, complete set of instruments, ready to fly. Great trailer for easy towing and rigging. Ueli Spring (313) 620-6692.

LIBELLE H301B, CF–XGE, O2, 720 chan radio, wing covers, encl metal trailer. $15,500. Rob Minchin (403) 639-2365 (H), 594-6719 (W).

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LARK IS28M2 motorglider, 1992 models, all aluminum, 27:1, side-by-side, fully aerobatic, +5.3/-2.65g limit. Howard Allmon (305) 472-5863, fax (305) 473-1234.

2 BLANIKS, C–GKMY, 2900 h, $17,000. C–FEJA, 3300 h, $12,000. Both recently refurbished, excellent in & out, basic instruments, radio. Vancouver Soaring Association, (604) 734-1177.

SUPPLIERS

REPAIRS & MAINT.

Sunaero Aviation. Glider repairs in fibreglass, wood, & metal. Jerry Vesely, Box 1928, Claresholm, AB T0L 0T0 (403) 625-3155 (B), 625-2281 (F).

Vankleek Sailplanes Ltd. Specializing in sailplane repairs in wood, metal, or composites. Call Günther Geyer-Doersch (613) 678-2694.

XU Aviation Ltd. Repairs in wood, metal and composites. C. Eaves (519) 452-1240 (B), 268-8973 (H).

INSTRUMENTS & OTHER STUFF

Barograph Calibrations, most makes and models. Walter Chmela, (416) 221-3888 (B), 223-6487 (H), #203, 4750 Yonge Street, Willowdale ON M2N 5M6

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Schleicher. ASK-21, 23, ASW-22, 24, ASH-25. Ulli Werneburg, 1450 Goth Avenue, Gloucester, ON K1T 1E4 (613) 523-2581.

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MAGAZINES

SOARING — the journal of the Soaring Society of America. International subscriptions $US35 second class. Box E, Hobbs, NM 88241 (505) 392-1177.

SOARING PILOT — bimonthly soaring news, views, and safety features from Knauff & Grove Publishers. $US20, add $8 for foreign postage. RR#1, Box 414 Julian, PA 16844 USA.

NEW ZEALAND GLIDING KIWI — the official publication for the 1995 World Gliding Championships at Omarama and the bi–monthly journal of the N.Z. Gliding Association. Regular updates on preparations for the 1995 event. Editor, John Roake. $US25/year. N.Z. Gliding Kiwi, Private Bag, Tauranga, N.Z.

SAILPLANE & GLIDING — the only authoritative British magazine devoted entirely to gliding. 52 pp, bi-monthly, and plenty of colour. Cdn. agent: T.R. Beasley, Box 169, L'Orignal, ON K0B 1K0 or to BGA, Kimberley House, Vaughan Way, Leicester, LE1 4SG, England. £15.50 per annum (US$30) or US$40 air.

AUSTRALIAN GLIDING — the journal of the Gliding Federation of Australia. Published monthly. $A38.50 surface mail, $A52 airmail per annum. Payable by international money order, Visa, Mastercard. Box 1650, GPO, Adelaide, South Australia 5001.

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